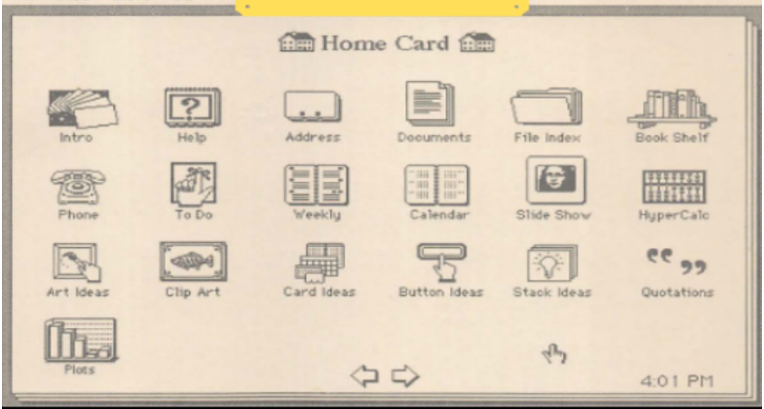
S.M. Oliva

COMPUTER CHRONICLES REVISITED

VOLUME 6



1987
1988

A review of the PBS series that aired from 1983 to 2002.

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Computer Chronicles Revisited, Volume 6

1987 - 1988

S.M. Oliva

S.M. Oliva, LLC

2023-08-13

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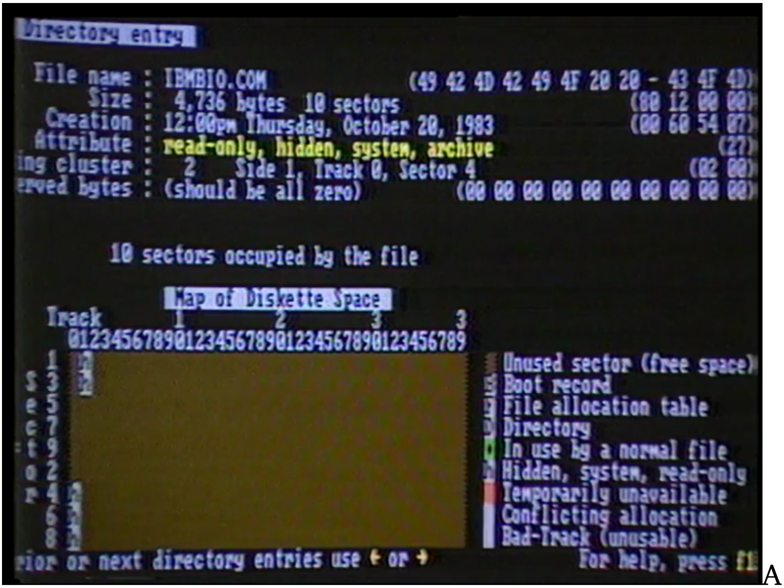
Introduction

This ebook reprints a series of posts from my blog *Computer Chronicles Revisited*, which I launched in May 2021. Each chapter covers a single episode of the PBS series *Computer Chronicles* that aired during the first half of the show's fifth season (October 1987 to January 1988). There is an extended recap of each episode followed by analysis of what became of the people and products featured on the program. Each chapter concludes with a section called "Notes from the Random Access File," an homage to the news segment that followed most *Computer Chronicles* broadcasts.



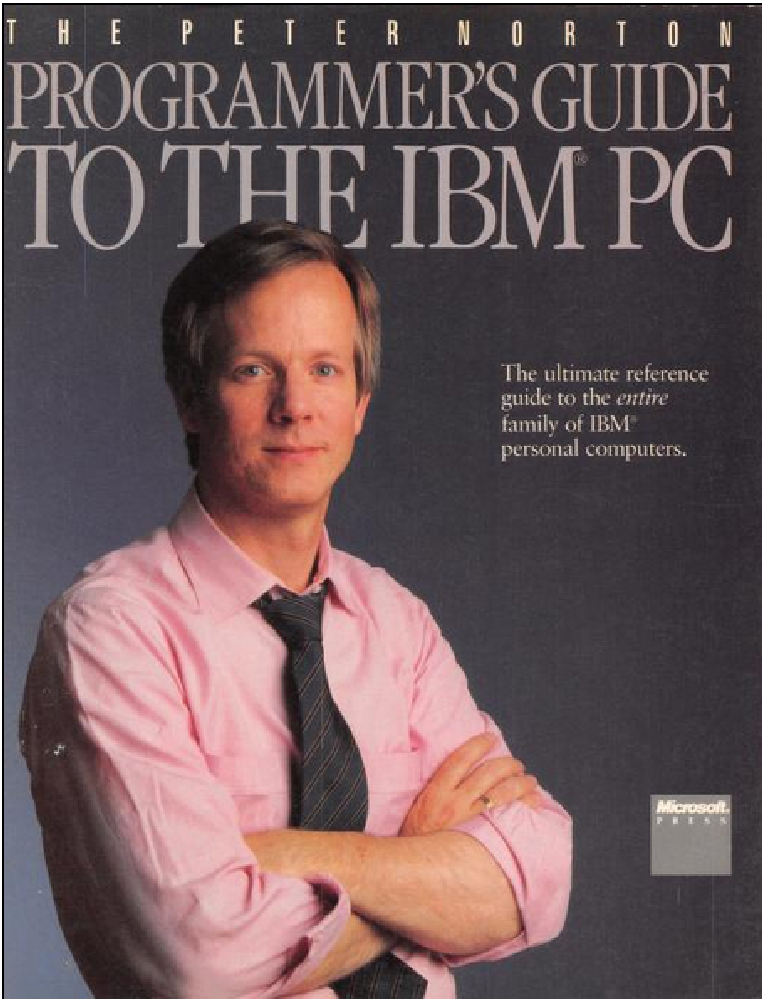
```
Directory entry

  File name : IBMBIO.COM               (49 42 4D 42 49 4F 20 20 - 43 4F 4D)
       Size :  4,736 bytes  10 sectors                         (80 12 00 00)
   Creation : 12:00pm Thursday, October 20, 1983               (00 60 54 07)
  Attribute : read-only, hidden, system, archive                       (27)
ing cluster :   2   Side 1, Track 0, Sector 4                       (02 00)
erved bytes : (should be all zero)        (00 00 00 00 00 00 00 00 00 00)


       10 sectors occupied by the file

                 Map of Diskette Space
    Track          1         2         3        3
      0123456789012345678901234567890123456789
     1                                            Unused sector (free space)
   S 3                                            Boot record
   e 5                                            File allocation table
   c 7                                            Directory
   t 9                                            In use by a normal file
   o 2                                            Hidden, system, read-only
   r 4                                            Temporarily unavailable
     6                                            Conflicting allocation
     8                                            Bad-Track (unusable)
rior or next directory entries use ← or →                For help, press F1
```

A sample screen from Peter Norton’s “DiskLook.” On the top of the scren is metadata about the diskette, including the file name, size, and creation date. On the bottom is a “map of diskette space” showing used and unused sectors.



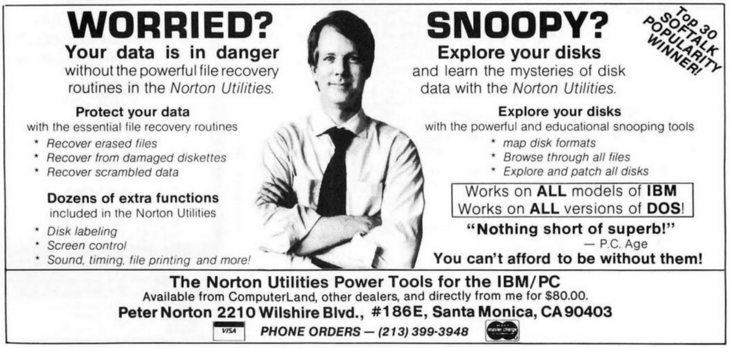
THE PETER NORTON

PROGRAMMER'S GUIDE TO THE IBM® PC

The ultimate reference guide to the *entire* family of IBM® personal computers.

Microsoft. PRESS

Peter Norton, wearing a pink dress shirt and tie, with his arms crossed.



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A 1983 ad in Softalk Magaizne for "The Norton Utilities Power Tools for the IBM/PC”. Peter Norton is pictured in his trademark cross-armed position.

Chapter 1: Software Utilities

Before moving on to the fifth season of *Computer Chronicles*, let’s return to the earliest days of the program to discuss an episode that had been lost until recently. There are several episodes still missing from the Internet Archive’s repository. Thankfully, one was recently located and digitized by the Stanford University library.

This first-season episode from March 1984 focused on software utilities. Herbert Lechner of SRI International joined Stewart Cheifet as co-host. (Gary Kildall was on a business trip to Japan.) Cheifet noted that many people who used computers didn’t know much about utilities. Was there an easy way to define what a “utility” was? Lechner said it was one of those terms that had not been precisely defined. Most people would agree that utility programs were those that helped you perform routine housekeeping functions that would otherwise occupy a lot of the user’s time and energy.

Cheifet then narrated a brief introduction to utilities over some B-roll footage of various computers, including an HP-150 and an Apple IIe. He said the personal computer’s popularity was due in large part to its enormous flexibility and friendly operation. For most PC owners, the machine was a means to speed up work tasks by providing more powerful tools to perform them with.

Programming utilities were the software tools that could increase the flexibility of the machine itself, Cheifet said. Utility functions could copy disks, reorder programs, translate languages, and even help retrieve material from a crashed disk. For a programmer, debuggers helped to uncover software problems by providing “break points” for examining the construction of a program. Once a problem was determined, debugging suppressors could find and correct the error every time it repeated. Other utilities like assemblers and compilers were the "translators" of programming languages, Cheifet continued. Whether a program was written in assembly code or in a high-level language, it depended on a translating utility to convert it into machine code.

Building a Better Pascal Compiler

Phillipe Kahn and Peter Norton joined Cheifet and Lechner for the first part of the next segment. Kahn was the president of Borland International. Norton was an author with Microsoft Press and president of his own company, Peter Norton Computing Inc. Lechner opened by asking Norton how he would define a "utility program." Norton said the simplest way to think of utilities was as a tool, like a screwdriver or a wrench. They helped people use their computers. Utilities were a type of intermediate software, falling between operating systems and end-user programs like a word processor. Utilities could therefore function as either professional or home-user tools.

Turning to Kahn, Cheifet noted that utilities were often thought of as "programmer's tools." How would these apply to end-user applications? Kahn said one example of an end-user utility would be a program that helped a user recover a file they accidentally deleted. There were also utilities that added features the operating system lacked but the user wanted. Then there were professional programmers who needed utilities to supplement the work of compilers.

Cheifet asked Kahn to demonstrate one of Borland's utility programs, *Turbo Pascal*. Kahn explained *Turbo* was his company's implementation of a compiler for the Pascal programming language. He said it was extremely fast and oriented towards both the professional user and the student. He pulled up an example on the in-studio machine–it looked to me to be an IBM PC/XT–and attempted to compile a sample program. *Turbo* returned an error message indicating a missing semicolon. Kahn said that with a normal compiler, if there was an error he would have to open up a separate editor to fix the problem. But with *Turbo*, he could just hit `ESC` and the program pulled up the source code and automatically placed the cursor on the line with the error. Kahn then added the missing semicolon and compiled the program successfully. Kahn said this whole process only took a couple of seconds with *Turbo* yet would required between 20 and 60 seconds with any other Pascal compiler.

Kahn then ran his sample program, which asked for a number and then printed a series of statements counting from 1 to the chosen number. Kahn then ran the program again, this time entering a character instead of a number when prompted. This would create a “type mismatch” error in Pascal. Kahn said that a traditional Pascal compiler would abort the program when presented with this error. *Turbo* also produced an error, but once again, by pressing `ESC`, the user was taken directly into the source code and shown the line where the error occurred.

Animating Your COBOL Debugging

Cheifet stepped over to the other side of the studio at this point to speak with another guest, Joanne Cannel, who worked in technical support with Micro Focus. Cannel was there to demonstrate *Animator*, which she described as a visual debugging tool for COBOL programmers. Similar to *Turbo Pascal*, *Animator* allowed a programmer to see their source code and watch it as it executed on the computer.

Cheifet asked how someone would accomplish the same task without a tool like *Animator*. Cannel said that when a programmer inherited someone else’s code and wanted to make a change, they had to be able to understand the program. That usually meant printing out a current listing of the program on paper and manually reviewing the code. With *Animator*, however, the programmer could watch the program attempt to run in real time.

Cannel then demonstrated this functionality on a sample COBOL program listing taken from *Byte* magazine, which displayed prime numbers. She explained you could execute a single line of the program by typing `X`. You could also type `U` to pull up a screen showing the user’s view of the program as opposed to the source code. If the current line required some sort of user input, *Animator* automatically switched to this user view. You could also reset execution at another point in the source code by typing in its position.

Cheifet asked for an explanation of *Animator*'s “Go” mode. Cannel said that executed the program at 5 times the default speed, allowing the programmer to review their code quicker. She said you could increase the speed level up to ‘9’.

Cheifet asked if this sort of tool was only useful for programmers. Cannel said it could be used as a learning tool for COBOL. It was primarily for maintenance and debugging, but it could also help someone understand what a program does. Cheifet sought clarification on what Cannel meant by “maintenance.” Cannel said about two-thirds of all programs in existence were already out in the world and needed to be maintained. The maintainer therefore needed to understand what the original programmer was doing with their code. *Animator* could help in that area.

Adding Macros and Recovering Deleted Files

David Rose joined Cheifet and Lechner for the final segment. Rose was director of product planning with RoseSoft, a Seattle-based software utility developer. Peter Norton also returned for this segment.

Cheifet asked Rose to explain his company's program *ProKey*. Rose described it as a “software accelerator.” When people bought off-the-shelf application software, they found it did 99 percent of what they wanted. Rose said *ProKey* helped the user customize that general purpose software to their specific needs. Cheifet clarified this made *ProKey* a utility for end users rather than programmers. Rose said it was for everyone who used a computer.

Lechner asked Rose for a demonstration of *ProKey* used in conjunction with the word processing application *WordStar*. Rose opened a sample text document in *WordStar* running on the XT. He explained that he wanted to move a sentence, something

WordStar could not do on its own. He first showed how *WordStar* required you to highlight a sentence using a series of keyboard commands to manually cut-and-paste the selection. You then had to re-format the paragraph to account for the new sentence.

With *ProKey*, in contrast, this entire process could be automated with a single keystroke. (In other words, it's using a macro). Rose setup a macro in *ProKey* that allowed him to simply place his cursor at the start of the sentence he wanted to move, type `ALT-S`, and then type a second keystroke in the location you wanted to move the sentence to. *ProKey* then automatically handled the reformatting.

Cheifet asked Rose what *ProKey* could add to other popular applications like *Lotus 1-2-3* or *VisiCalc*. Rose said the first thing you could do was "remove the blemishes" from those products. You could also "store knowledge" of one user for another user. For example, one person could create a script to automate the creation of a spreadsheet by a less-experienced user.

Turning back to Peter Norton, Cheifet asked about his utility package, *The Norton Utilities 2.01*. What did it do? Norton explained it was a toolkit. The first tool he demonstrated was *DiskLook*, which presented a visual representation of a floppy diskette's contents. He pulled up the *DiskLook* menu on the XT. For example, you could pull up a "map" of the diskette that showed the location and metadata for individual files (see below). You could also pull a map of the entire diskette showing all files together. This could help the user identify unused portions of their disk, as well as any "bad" or unusable sectors.

Cheifet next asked Norton about his file-recovery tool. Norton explained that people often accidentally deleted data from their disks. But it turned out that the deleted file didn't actually disappear from the disk–it was simply rendered unusable. It was like taking a folder out of the filing cabinet and throwing it in the trash. If the trash hadn't been hauled out yet, you could still pull the folder out and put it back in the cabinet. The same principle applied to Norton's *UnErase* utility. It was technically complicated but conceptually simple.

Norton ran *UnErase* on the XT, which pulled up a similar menu to the one from *DiskLook*. (All of the *Norton Utilities* were actually separate programs that could be run from one of two diskettes.) The program produced a list of files that had been recently deleted. He selected a file, which then brought up a screen explaining how much of the original data was still intact. *UnErase* then scanned the sectors with the deleted data and displayed them. Norton confirmed that he wished to recover each of the sectors. This let you determine if everything was recovered or if there was any extraneous information included. Once he confirmed everything was okay, Norton told the program to save the recovered file.

Cheifet asked for further clarification on what it meant to recover a deleted file. Norton said deleting a file basically told the operating system to "throw it away," i.e. to move the file from where the work was going on to a "trash" pile. So long as the space on the disk hadn't been reused, you could go in and still find the information.

Lechner asked Norton how he determined what would be a good idea for a utility program. Norton said you started off by using the computer and finding you needed something. You then created a utility program for your own use. And then you realized the rest of the world could use it too.

Cheifet asked Norton about the other utilities he offered. Norton said *Norton Utilities* came with 20 programs in all. Five of them provided variants of file recovery for different scenarios, such as dealing with physical damage to a diskette. Other utilities helped users keep track of how much time they spent using the computer.

Norton Turned Lost Term Paper Into $70 Million Business

With their appearances in this episode still relatively early in their respective computer careers, Peter Norton and Philippe Kahn became two of the best-known software developers of the

1980s. In particular, Norton became something of an iconic figure, as his picture adorned a wide range of computer books and software utilities through the 1990s. Norton eventually trademarked his signature "standing cross-armed" pose, as first seen on the cover of his book, *The Peter Norton Programmer's Guise to the IBM PC*:

Born in 1943 in Aberdeen, Washington, Norton graduated from Reed College in Portland, Oregon, in 1965. He spent the early part of his career working for various employers, including Stanford University, Honeywell, and the NASA Jet Propulsion Laboratory. While attending graduate school at the University of California, Berkeley, in 1982, Norton purchased an original IBM Personal Computer.

After accidentally erasing a term paper, Norton designed his first PC utility program, which he called *Undelete*. This became the foundation for *The Norton Utilities*. Norton formally started his business in September 1982–appropriately named Peter Norton Computing, Incorporated (PNCI)–and released version 1.0 of *Norton Utilities* later that year. The version demonstrated in this episode was 2.01, which likely released in November 1983.

After starting out by selling *Utilities* by mail order from his California apartment (see the ad below), Norton quickly became a major name in the PC industry. He went on to write the aforementioned *Programmer's Guide to the PC* and wrote regular columns for publications like *PC Magazine*. As Paul Schatt noted in a November 1985 column for the *Arizona Republic*, "The Peter Norton industry now drives itself; his books sell his programs, which recommend his columns, which push his programs."

PNCI's revenues grew from $500,000 in 1983 to $11.2 million by 1987 and $25 million in 1989. By 1990, Norton was ready to cash out. In May 1990, he sold PNCI to Symantec Corporation in an all-stock transaction valued at around $70 million. Norton had never taken his company public, so he still owned 97 percent of PNCI at the time of the sale. That translated into about a 30-percent share of Symantec once the deal closed.

Peter Norton effectively retired from the computer software industry after selling his company, although his name and crossed-armed portrait continued to appear on various Symantec-published utility programs through the end of the 1990s. Symantec later split into two companies, one of which became known as NortonLifelock Inc. In 2022, the Czech Republic-based company Avast Software s.r.o. acquired NortonLifelock and renamed the company Gen Digital Inc. Gen Digital continues to use the "Norton" name to develop and market a range of digital security and online privacy software products.

Kahn Rebounded from Borland Dismissal to Develop Early Camera Phone Prototype

Philippe Kahn got his start in the PC industry around the same time as Peter Norton. Born and raised in France, Kahn spent time as a university mathematics instructor before getting his start in business when he bought a bankrupt shell company in Ireland. Kahn initially planned to use the Irish company to distribute computer software, but when that venture failed, he relocated to the United States in 1982. In May 1983, he founded Borland International.

Turbo Pascal was one of Borland's first hits, selling more than 200,000 copies in the year following its initial November 1983 release. Kahn followed that up with *Sidekick*, a memory-resident personal information manager for MS-DOS computers, which sold 80,000 units in its first year.

By August 1985, Borland had shipped over 1 million units of its various software products, Kahn himself was described as "almost a cult figure" by one industry analyst, according to Knight-Ridder's Mary A.C. Fallon. Much of Borland's success was based on its low prices relative to other business software companies–in some cases charging up to $300 less than the competition.

At its peak, Borland reported annual revenues as high as $500 million. But things started to decline sharply in the 1990s. Kahn's aggressive push of Borland into the business applications market was a significant factor in that decline. In 1988, Borland launched *Quattro Pro*, a spreadsheet designed to compete head-on with *Lotus 1-2-3*. This eventually prompted a copyright infringement lawsuit from Lotus Development Corporation. Borland would ultimately prevail following a 1996 United States Supreme Court ruling, but in the meantime both companies lost most of their market share to Microsoft's *Excel*.

Borland had also acquired Ashton-Tate in 1991. Ashton-Tate's *dBase* had been the dominant database manager of the mid-1980s. But the disastrous release of *dBase IV* in 1988 led to that company's downfall and eventual sale. This led to an internal battle between the newly acquired *dBase* team and the developers of Borland's existing database product *Paradox*. And once again, Microsoft ultimately proved the beneficiary as its *Access* database manager dominated on the Windows platform.

Faced with an unwinnable war with Microsoft, Kahn sold off a number of Borland's product lines, including *Quattro Pro*. He also wanted to sell off the feuding database programs. Borland's board of directors rejected that plan and instead demanded Kahn's resignation, which he tendered in January 1995. John Dodge, writing in the *Boston Globe* two years later, said Kahn had run Borland "into the ground" due to his failure to cede day-to-day leadership of the company to less "ego-driven" executives.

But Kahn didn't spend much time reflecting on his defeat. He quickly moved to start a new company, Starfish Software, Inc., which actually acquired several Borland software titles, including the legacy program *Sidekick*. Starfish's main focus, however, was developing intellectual property for wireless devices. Kahn sold Starfish to Motorola in 1998 for $325 million.

Kahn then moved onto this next venture, LightSurf, where he developed what may be his biggest claim to fame today–the invention of the camera phone. On June 11, 1997, Kahn's wife Sonia gave birth to their daughter Sophie. Kahn hacked together a setup using a Casio QV-10 digital camera, a Motorola StarTac flip-phone, and a laptop. This enabled Kahn to upload pictures of the new baby to his home server so that family and friends could access the images over the Internet.

Recalling the aftermath of this historic event to Larry Magid in 2017, Kahn said he realized his “Rube Goldberg” setup could be developed into an actual consumer product. He attempted to sell the idea to Kodak and Polaroid, but they both passed. Kahn and LightSurf eventually developed a working prototype in conjunction with Casio and Sprint in 2002.

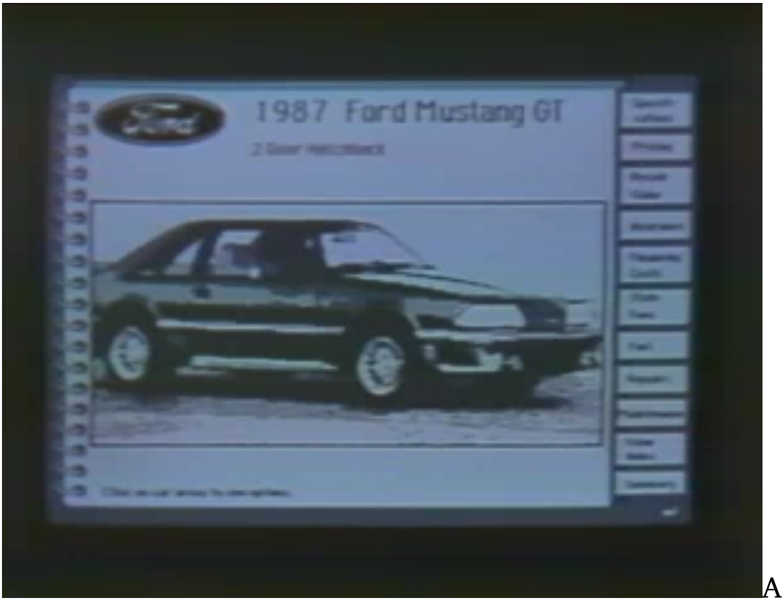
Kahn sold LightSurf to VeriSign Inc. in January 2005 in a $270 million all-stock deal. Later that year Kahn started his most recent company, Fullpower-AI, where he continues to serve as CEO as of this writing.

Notes from the Random Access File

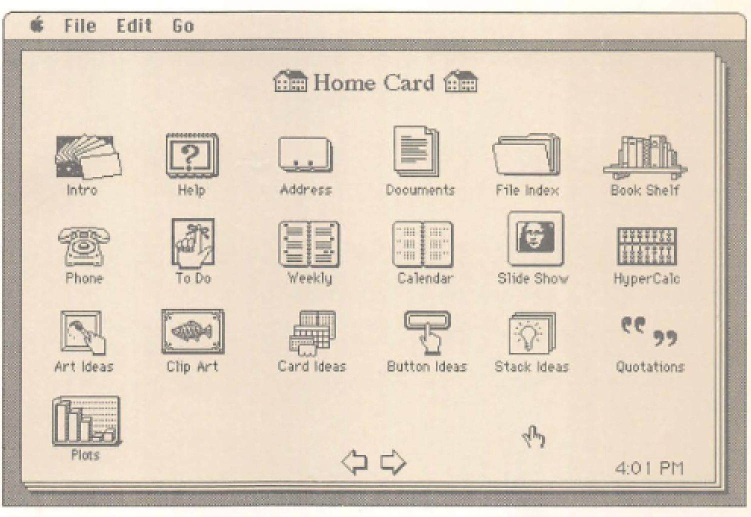
- This episode is now available at the Internet Archive, having recently been found and digitized by the staff at the Stanford University library. This episode was likely recorded on March 13, 1984, based on a screenshot taken from Peter Norton’s on-air demo.
- The recording from Stanford was part of the *Computer Chronicles* telecourse series, which included a number of interstitial segments presented by Herbert Lechner. This episode was part of chapter eight of the original course, although it was the 20th episode recorded during the 1983-84 season.
- Micro Focus was the presenting sponsor of *Computer Chronicles* during this first season. Ironically, Micro Focus acquired Borland International in 2009. In January 2023, Ontario, Canada-based OpenText bought Micro Focus for $5.8 billion.
- RoseSoft’s *ProKey*, first released in 1982, established itself as the early leader in the market for MS-DOS keyboard utilities. Philippe Kahn’s Borland later entered the market with its own macro editor, *Superkey*. In September 1992, CE Software Holdings Inc. purchased the privately held RoseSoft and its *ProKey* intellectual property for an undisclosed amount.
- As long as we’re talking acquisitions, SRI International,

Herbert Lechner's old stomping grounds, recently announced it would "receive" the famed Palo Alto Research Center. This isn't exactly a merger. SRI is a nonprofit organization. Xerox, which owned and operated PARC as a subsidiary, will instead donate the company's assets to SRI.

- Peter Norton's post-software career has largely been spent serving on various boards and building his impressive collection of modern art. According to a 2016 report by Judy Moore, Norton is believed to be one of the top 200 art collectors in the world, with approximately 2,700 pieces in his collection.
- Perhaps the most dated thing about this episode are the two programming languages discussed, COBOL and Pascal. According to the 2022 Stack Overflow Developer Survey, only 0.65 percent of respondents still work in COBOL, the fourth-lowest among all languages listed. Pascal didn't even make the list.

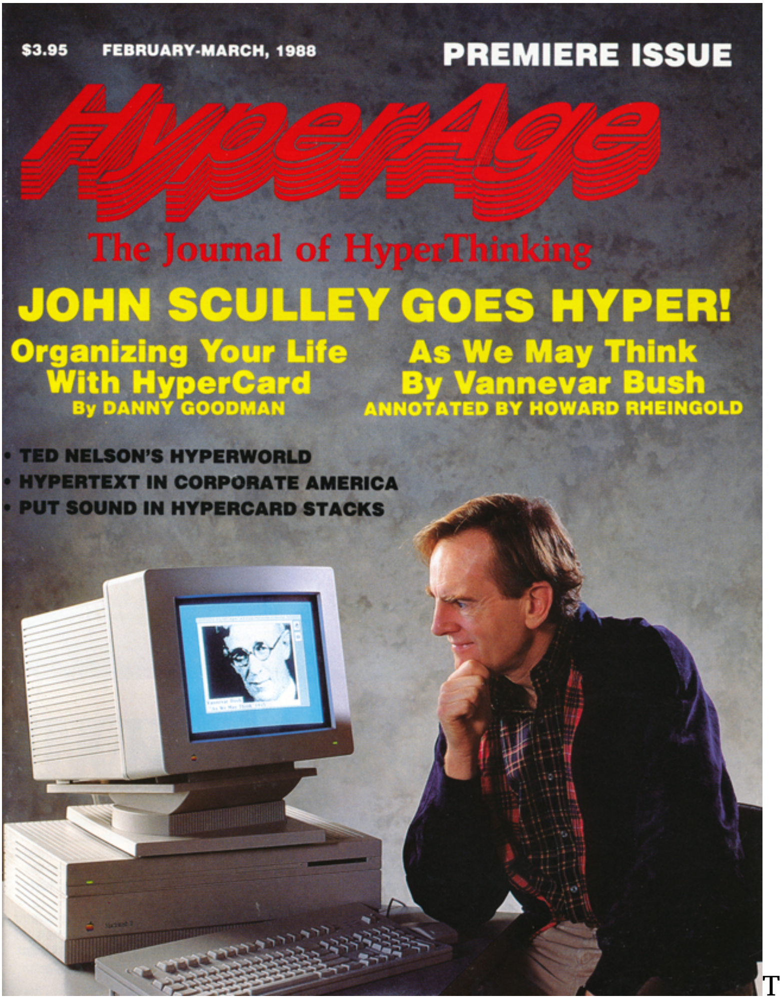


A screenshot from “The Complete Car Cost Guide” for HyperCard. There is an image of a 1987 Ford Mustang GT that covers most of the screen. To the right are a series of buttons.



The “Home Card” menu of Apple’s HyperCard. There are four rows of icons representing various “stacks” including an address book, file index, and to do list.

Robert Stein appearing on “Computer Chronicles.” He is seated at the studio desk using a Mouse to control “HyperCard” running on a Macintosh computer. To the left of the Macintosh is a video monitor sitting on top of a Laserdisc player. The video monitor is displaying a piece of art by French painter Clause Monet.


$3.95
FEBRUARY-MARCH, 1988
PREMIERE ISSUE
HyperAge
The Journal of HyperThinking
JOHN SCULLEY GOES HYPER!
Organizing Your Life With HyperCard
By DANNY GOODMAN
As We May Think By Vannevar Bush
ANNOTATED BY HOWARD RHEINGOLD
• TED NELSON'S HYPERWORLD
• HYPERTEXT IN CORPORATE AMERICA
• PUT SOUND IN HYPERCARD STACKS

The cover of the premiere issue of “HyperAge” for February-March 1988. John Sculley is seated with his chin atop his right hand. He is looking at a Macintosh II running HyperCard. The main headline reads, “John Sculley Goes Hyper!”

Chapter 2: HyperCard

On August 11, 1987, Apple announced the release of *HyperCard* at the opening of the Boston Macworld Expo. In modern parlance, *HyperCard* was a type of middleware. It was software that allowed users to create Macintosh applications without having to understand the underlying operating system or traditional programming languages–both of which had been substantial barriers to entry for potential third-party developers.

At its core, *HyperCard* was a relational database management program. But the way it related data was through the use of hyperlinks. Today, we know hyperlinks as the glue that holds the World Wide Web together. Of course, the first web browser was still several years away when *HyperCard* debuted in 1987. So the commercial application of hyperlinks–something that had been around in academic computing circles since the late 1960s–was big news among the late 1980s tech press.

Indeed, when the fifth season of *Computer Chronicles* premiered just a few weeks after the Boston Macworld announcement, the program was all about *HyperCard*. Stewart Cheifet opened the program by showing Gary Kildall an ERECTOR Set, a brand of metal construction toys popular during the earlier part of the 20th century. Cheifet noted that the inventor of *HyperCard*, Bill Atkinson, had compared his product to an ERECTOR Set. But people were having trouble understanding this concept. So what was the basis for *HyperCard*?

Kildall explained that *HyperCard* was based on hypertext, a concept introduced by Ted Nelson and Douglas Engelbart in the 1960s. Say you wanted to do research on a particular subject. The subject matter may exist in all sorts of different places, such as books, magazines, videos, tape recordings, and even CompuServe forums. If you could link all of that stuff electronically, you could click on the name of the subject–such as “Beethoven”–and jump quickly from one information source to the next. This was what hypertext and “hypermedia” were all about–and that was supposed to be the foundation for *HyperCard*.

Using HyperCard to Shop for a New Car

Wendy Woods presented her first remote report from an automobile dealership in San Jose, California. (Don’t worry, this is going somewhere.) Woods said that shopping for a new car could be a bewildering experience. Making the wrong choice among look-alike models at breathtaking prices could turn a simple purchase into a lifelong mistake.

Woods said that Peter Levy thought he could take some of the risk out of car buying with the help of a Macintosh and *HyperCard*. Levy wrote a program to construct a model car according to specific choices entered by the buyer. This program, known as *The Complete Car Cost Guide*, was based on a traditional book of the same name.

The *Guide* used *HyperCard* visual cues to prompt a first-time user to enter the kind of information that would affect the cost of car ownership, such as optional equipment, yearly mileage, and geographic location. The screen then presented notebook-like pages that flipped and turned, and commands could be entered by either placing the Macintosh cursor over a menu bar, a *HyperCard* button, or by simply pointing-and-clicking on the appropriate part of the vehicle (see below).

Woods said *The Complete Car Cost Guide* didn't promise to turn a shopping chore into a happy experience, but the *HyperCard* "stacks" made it easy to personalize several choices and then compare them side-by-side. Two vehicles might cost the same but differ sharply in the long term because of depreciation and operating costs. But in spite of individual differences, owning any vehicle was expensive. Indeed, the *Guide*'s opening screen contained a reminder that the first four years of ownership would cost more than the original price of the car.

An Erector Set for Non-Programmers

Bill Atkinson and Dan Winkler, the principal developers behind *HyperCard* at Apple, joined Cheifet and Kildall in the studio for the next segment. Kildall quipped that "HyperCard" sounded like a hardware board that you plugged into a computer system, but Apple's *HyperCard* came on four floppy disks.

Kildall asked Atkinson to explain what *HyperCard* was all about. Atkinson said it was a software "ERECTOR Set" that let non-programmers put together interactive information. Cheifet asked for a demonstration using *HyperCard* on a Macintosh II setup in the studio. Atkinson said *HyperCard* used “cards” containing graphics, text, and buttons. He pulled up a sample stack of cards. He pressed a button on one of the cards, which in turn displayed another linked card. He said you could program lots of buttons to do different things.

Atkinson continued the demo, noting that individual cards were grouped together into “stacks” that were saved to a floppy disk so you could share them with other people. You could also organize the cards so that any card could “jump” to any other card. Kildall observed this was the hypertext function built-in to the system. Atkinson concurred. He said *HyperCard* offered the freedom to organize information according to how things associated with one another, rather than the order the cards appeared on a list.

Atkinson showed some of the other functions you could program into the buttons, such as triggering a sound effect. He said you could also have different sizes and types of cards. For example, you could insert an expense report or appointment book into a card. You could also insert interactive media, such as a musical keyboard that played actual notes. The cards could therefore contain both information and interaction.

Kildall asked if users could make their own stacks of cards. Atkinson said yes. *HyperCard* came with a set of stacks that could be used as-is, but you could also make your own. Some people started by making small changes to the included stacks and then used that to make fresh ones. He added that several hundred user-made *HyperCard* stacks were already available on public computer networks.

Atkinson then demonstrated some more functions of *HyperCard*, such as searching for information within a stack using natural-language phrases, e.g., `find jim` in an address book card. He opened a datebook card stack and showed how you could change from a daily to a weekly view. Another stack contained a to-do list that linked to an address book. Not only did *HyperCard* allow for hyperlinking of the different data sources, it could also be programmed to perform a search once it got to the linked card or stack.

Atkinson next showed a stack with more “graphical” information. He typed, `find horse` and it pulled up a card with an image of a horse. You could then use navigational buttons to go to the next search result, i.e., show the next card with the word “horse” on it. Similarly, if you touched a button linked to the image of a wheel, *HyperCard* pulled up other cards with images of wheels on them. So hyperlinks could be used to express “thematic threads” throughout the underlying information.

Turning to Winkler, Cheifet noted he was involved in creating HyperTalk, the high-level programming language used in *HyperCard*. In simple terms, Winkler explained that HyperTalk told the buttons on the cards what to do. If you looked inside a button you could see its HyperTalk script. There was a message box in the *HyperCard* display where you could enter HyperTalk commands. This included the ability to perform math and date functions or enter commands such as `go to next card`. These same commands were used in the scripts for the buttons.

Kildall clarified that this was how a customer would actually program the buttons themselves. Winkler said that was right. Atkinson then showed how you could make a new button. He drew a box representing the button on top of an existing card–specifically, the eye on a picture of a fish–and then linked that to the command `find 'eye'`, which would then search for other cards with images of eyes. Winkler emphasized to do this didn’t require any knowledge of scripting, but once you did learn the scripting, you could could go in and modify the button’s function by hand. Winkler demonstrated by adding a visual effect, in this case a “dissolve” animation, to one of the buttons. He then added a sound effect (a “boing”).

Atkinson continued, explaining that *HyperCard* came with “boxes of parts” for the user ready to go. For example, there was an included set of clip art. There was also a library of buttons and card stack templates. He then created a new stack using one of the templates.

Adding Interaction to Text and Graphics

Danny Goodman joined Cheifet and Kildall for the next segment. Goodman was the author of *The Complete HyperCard Handbook*. Bill Atkinson also remained for this segment. Cheifet asked Goodman about his reaction the first time he saw *HyperCard*. Goodman said he'd been covering the computer industry for several years, and there were only three things that made him "tingle" when they were new: the Macintosh, the LaserWriter, and now *HyperCard*.

Cheifet noted that Goodman was a writer but not a programmer. But he had still managed to develop some stacks using *HyperCard*, including *Focal Point*, which was recently published by Activision. Goodman explained that *Focal Point* was a collection of stacks that helped you manage your business. He initially wrote the stack for his own use.

Goodman performed a brief demo of *Focal Point*. There was an appointment book, an "intelligent" to-do list that let you rank and sort items by priority, a telephone management system, a function to create "mini-groups" of documents, and a database for client information. *Focal Point* then looked at all of the information on the various cards and created a single information screen showing various tasks and related information according to their deadlines. (Kildall quipped he could really use something like this.)

Cheifet asked Atkinson how he reacted to a non-programmer like Goodman using *HyperCard* in this manner. Atkinson said it was very rewarding. It confirmed that his "software erector set" approach was actually working.

Cheifet noted that Apple was handling *HyperCard* in an "unusual" way. Atkinson elaborated that it came free with new Macintosh computers. Existing Macintosh owners could also purchase *HyperCard* for $49. He wanted to make sure everyone had access to the tools to make their own stacks.

Kildall asked if *HyperCard* could become a useful tool for businesses. Atkinson said that *HyperCard* would open up the software architecture of the Macintosh. It would let the nature of information on a computer go from "text and graphics" to "text and graphics and interaction." It would allow a whole new group of people who had ideas, but weren't programmers, to express their ideas or expertise.

Whole Earth Catalog Moves to CD-ROM Thanks to HyperCard

Wendy Woods returned for her second remote segment, which focused on the use of *HyperCard* by *The Essential Whole Earth Catalog* in Sausalito, California. Woods noted the *Catalog* had been published since 1969. It was basically a listing of useful and hard-to-find products. And some 2.5 million copies had been sold worldwide. But for the first time, Woods said, the entire *Catalog* would now be published on *HyperCard*. The software actually solved a problem with which the editors had been struggling, namely how to make locating, tracking, and expanding upon information in the catalog faster and more efficient.

Kevin Kelly of the *Catalog* told Woods that part of the problem with other software they had looked at was that accessing information wasn't very visual. And the *Catalog* was a very graphic medium. Since *HyperCard* dealt with graphics, it was able to meet their requirements. *HyperCard* was also easy to build with. None of the *Catalog* staff were "hackers" or programmers. And *HyperCard* was something they could use without having to learn a new language.

Woods said that the text and pictures used in the *HyperCard* version of the *Catalog* were captured with an optical scanner or video camera. *HyperCard* also allowed sound effects to be added, which the user could hear simply by clicking a mouse button.

This was considered the largest *HyperCard* ever undertaken, Woods continued. With an output the equivalent of about 80 diskettes, the project was expected to reach its final form as a CD-ROM or optical disc.

“Year One” of Interactive Video

For the final segment, Robert Stein joined Cheifet and Kildall in the studio. Stein was with the Los Angeles-based Voyager Company, which published *The National Gallery of Art Laserguide* using *HyperCard*. Kildall noted that Stein’s product worked with a full-sized videodisc, which was a relatively old technology that could store about 30 minutes of video or 54,000 still images.

Kildall asked Stein to explain how his system worked. Stein explained they took an existing videodisc produced by the National Gallery of Art, which included pictures of the museum’s entire collection. He then used *HyperCard* to make it possible for people to look at these images in different ways. For example, you could click on a button to bring up a chronological index that let you select collections by century. Other buttons enabled you to sort by the artist’s name, nationality, or artistic style. Each item brought up a card in the stack with information on the Macintosh and displayed an image of the selected artwork on a separate video monitor attached to a Laserdisc player (see below). Some of the cards also displayed a camera icon, which indicated there was a short video sequence to accompany that item, which he demonstrated. The user could also add their own notes to individual cards. Those notes could then be searched for later as well. There was also a “serendipity” button that displayed a random item.

Stein continued, demonstrating how you could search using keywords such as `find all impressionist landscapes with boats`. He added that *HyperCard* would remember the last 42 things he looked at. (A possible *Hitchhiker’s Guide* reference?) So you could press a button to retrace your steps.

Kildall, ever enthusiastic about this subject, asked Stein what he thought *HyperCard* meant to the development of “interactive video.” Stein noted he had been in the business for seven years and previously there had not been a computer powerful enough to control a videodisc in this manner. But *HyperCard* and the Macintosh together meant this was now “year one” of interactive video.

Atkinson Played Key Role in Early Apple Products

Bill Atkinson grew up in California. He earned a bachelor's degree in chemistry and biochemistry from the University of California San Diego (UCSD) before heading to Seattle to do graduate work in neuroscience at the University of Washington. In 1978, a friend from UCSD, Jef Raskin, invited Atkinson to visit him at Apple back in California. Atkinson later recalled in an oral history interview that Steve Jobs "spent the better part of the day with me putting on his best sell for why I should come down and work at Apple based only on Jef Raskin's high recommendation of me."

A week later, Atkinson joined Apple. He started out working on software for the Apple II. One of his first projects was porting a Pascal-language interpreter originally created at his alma mater, USCD, to work on the Apple II's 6502 microprocessor. The Pascal system was necessary to build software for the Apple Lisa, where Atkinson served as one of the principal developers for the graphical user interface. He then joined the Macintosh development team, where he created the drawing program *MacPaint*, one of the first applications to ship with the new computer. *HyperCard* itself built on some of Atkinson's earlier work with *MacPaint*, as it included tools to create bitmap images within card stacks.

Atkinson remained at Apple until July 1990, when he and two colleagues left to form a new company called General Magic. This was actually a spinoff from a project that Atkinson had been working on at Apple. At the time, Atkinson's group wouldn't even say exactly what their project was–only that it would be a "Personal Information Communicator."

The history of General Magic will no doubt be the subject of a future blog post. But to briefly summarize, General Magic attempted to develop what would eventually become the personal digital assistant and later the smartphone. The company attracted a good deal of media and industry attention in the

1990s and launched a successful public offering in 1995. But aside from developing software used in a few late-1990s devices, Digital Magic never achieved substantial results and closed its doors in 2002.

Atkinson didn't last that long, departing General Magic in 1995. In the 2000s he turned his attention to nature photography. Atkinson later combined his interests by releasing an iOS app called *PhotoCard*, which converts digital images into either electronic or physical postcards. *PhotoCard* launched in 2009 and is still available from the App Store today, which has to make it one of the longest continuously developed apps for that platform.

Chronicles Regular Started Short-Lived HyperCard Magazine

HyperCard also had a rather long lifespan. Since this is a program that will come up many more times on *Computer Chronicles* going forward, I won't delve into an exhaustive history at this time. But Apple continued to update *HyperCard* until 1998. And it was not officially withdrawn from the market until 2004.

In terms of the launch of *HyperCard*, Gary Kildall and Stewart Cheifet weren't the only *Chronicles* regulars excited by Bill Atkinson's invention. Jan Lewis of the Palo Alto Research Group said following the Boston Macworld launch event, "This is a breakthrough produce that will create an entire new class of software."

Lewis was so inspired that at the subsequent January 1988 Macworld in San Francisco, she announced the launch of a new magazine dedicated to *HyperCard* called *HyperAge*. The first issue, released in February 1988, featured Apple CEO John Sculley on the cover (see below) and articles from Danny Goodman and Bill Atkinson, among others.

Sadly, *HyperAge* didn't stick around for long. Lewis quickly got into a dispute with her business partner, Andrew Wolf, and by the time the West Computer Faire rolled around in April 1988, *HyperAge* had disappeared, failing to make any presence at its scheduled booth. According to reporting from Wendy Woods, Lewis sued Wolf for breach of contract a few weeks earlier seeking dissolution of their business partnership. *HyperAge* did manage to publish at least one more issue, but the company was out of business by 1989, according to California state of records.

As for the rest of the early press response to *HyperCard*, most of what I found was positive. Lawrence J. Magid of the *Los Angeles Times* wrote after the Macworld launch that *HyperCard* was a "dream come true" for many Macintosh users who traditionally found the machine difficult to program. Magid even managed to create a personal information program after just a couple of days of use. Still, he thought that *HyperCard*'s greater potential was as a platform for third-party developers.

> *HyperCard* is easier to use than most languages, but I don't anticipate the day when every computer user is a programmer. Most are content to let other people design their programs. What we will see, however, is a larger corps of people creating programs for use by colleagues. [Bill] Atkinson is encouraging sophisticated users to create *HyperCard* programs that can be distributed to others within an organization, shared as part of public domain software libraries or sold through the normal software distribution channels.

Indeed, this is largely what came to pass. As I said in my introduction, *HyperCard* was effectively an early form of middleware, which was something the Macintosh desperately needed to spur development. Recognizing this, Atkinson said he was the one responsible for getting Apple to bundle *HyperCard* with new Macs for a period of at least two years following the launch.

The main criticism of *HyperCard* from contemporary sources focused on the software's perceived suitability, or lack thereof, for creating business applications. Computer consultant Ken Agle wrote in May 1988 column for the *Palo Alto Times Tribune*:

> *HyperCard* should not be mistaken as a suitable environment for developing an accounting, fund-raising, or billing system. It is not a relational data base in the sense of *dBase III* for the PC or *4th Dimension* for the Mac. […]
>
> Another thing about *HyperCard*: No matter what they say, it isn't easy to create your own *HyperCard* program, at least not a good one.
>
> As preemptive evidence, I cite the number of pages in a typical *HyperCard* handbook: about 600. Now, nothing that takes 600 pages to explain can be easy, right?

Tony Tyler of London's *Guardian* took an even harsher stance in a November 1988 column, declaring, "In the first year since the launch of this quite remarkable but fundamentally useless piece of software, I have heard of no Mac-equipped business where *HyperCard* has been present on a single individual's hard disc for longer than a week." This prompted a number of letters to the editor from people throughout England who had, in fact, used *HyperCard* to develop and sell their own business applications.

In the long run, the problem was not developers finding business uses for *HyperCard*. Rather, it was the limited reach of the Macintosh platform in a world dominated by the IBM PC standard. And Apple wasn't quite sure how to market *HyperCard* in its early days–one of the initial advertising slogans was, "Hypercard–But What Is It?"–which probably spoke to the company's relative lack of experience at the time when it came to selling software as opposed to hardware. This was also a transitional period for Apple, as just before the August 1988 Macworld it created a software-specific spinoff, Claris Corporation, which assumed responsibility for a number of former Apple first-party titles, including Bill Atkinson's original *MacDraw*.

Activision's Brief HyperCard Diversion Proved Pointless

Danny Goodman's *Focal Point* was published by Activision. That might sound strange to people familiar with the company's origins as a publisher of cartridges for the Atari VCS (2600) or its modern incarnation as the gaming giant Activision Blizzard. But the debut of *HyperCard* coincided with a brief, somewhat forgettable period in the history of the Activision brand when the company tried to diversify its offerings into business and multimedia applications for personal computers.

Activision co-founder David Crane appeared on a January 1985 *Chronicles* episode to demonstrate his popular Commodore 64 game, *Ghostbusters*, which came at a time when the company was still rebuilding after the disastrous collapse of the North American home video game market in 1983. Activision managed to survive–and even go public–during this period, but mounting losses led the company's board to oust co-founder and CEO Jim Levy in January 1987.

Levy had already dipped Activision's toes into the water of non-gaming computer software prior to his departure, releasing titles such as the drawing program *Paintworks Plus* for the Apple IIgs. But Levy's successor, Bruce Davis, decided to double down on the strategy. This included releasing applications based on *HyperCard*.

Activision announced both *Focal Point* and *Business Class*, the latter also a Danny Goodman program focused on business travelers, at the September 1987 Applefest in San Francisco. *Focal Point* started shipping to stores that December, initially retailing for $100. In May 1988, Davis changed the name of the company from Activision to Mediagenic. Activision remained as a brand name used for Mediagenic's game offerings. But *Focal Point* and other business software was placed under a new division called TenPointO.

In November 1988, TenPointO shipped Goodman's update to his original application, appropriately named *Focal Point II*. This program retailed for $200 new or as a $90 upgrade for existing *Focal Point* users. Of course, by that point it was already becoming clear that Davis' reorganization plan wasn't quite working as well as he'd hoped. In late November, Mediagenic laid off about 10 percent of its staff amid what Davis admitted were “sluggish” sales of computer software. Overall, Mediagenic’s profits were down 92 percent from the previous year as Activision.

Sales rebounded somewhat during the 1988 holiday season. But 1989 did not see significant improvements overall. In October 1989, Davis decided to sell off the TenPointO division, divesting itself of *Focal Point II* and other business applications, which only accounted for about 8 percent of Mediagenic’s total revenues. The company ended up reporting a $1.9 million quarterly loss following the sale. Davis told the press he’d decided to go back to focusing Mediagenic solely on video games and computer entertainment software. (I don’t know who actually bought TenPointO, but *Focal Point II* was apparently the final release of that program.)

Notes from the Random Access File

- This episode is available at the Internet Archive and first aired during the week of October 28, 1987.
- Peter Levy founded a company, IntelliChoice, to market his *HyperCard*-based *Complete Car Cost Guide*. A former Apple product manager, Levy grew IntelliChoce from a one-person startup to a $4 million company that became the largest provider of car reports in the world. Primedia Inc. purchased IntelliChoice from Levy in April 1997 for undisclosed terms. Levy went on to serve as a co-founder and CEO with several additional tech startups and currently sits on a number of boards.
- Dan Winkler left Apple to join Bill Atkinson at General Magic in 1990, where he stayed until 1994. I couldn’t find much about his professional work since the mid-1990s.
- Danny Goodman has authored nearly 50 computer books, including multiple revisions of *The Complete HyperCard Handbook* published through the early 1990s. Since the early 2000s, he’s also worked as a consultant for iOS development and intellectual property litigation.
- Kevin Kelly is probably best known today as the co-founder of *Wired* magazine, where he also served as

executive editor from 1993 to 2000. In addition to his work as publisher and editor of the *Whole Earth Review* from 1984 to 1990, Kelly also served as director of the Point Foundation, which was the early parent of The WELL, an early online service previously featured on *Computer Chronicles*. Today, Kelly oversees the blog *Cool Tools*, which he started as a mailing list in 2000, and is co-chair of The Long Now Foundation.
- Bob Stein attended Columbia University and Harvard, so naturally he became a Communist revolutionary. One day while using the bathroom at the local Communist Party headquarters in Chicago, Stein somehow managed to find a copy of *BusinessWeek*, which contained an article about the early work on what became the Laserdisc. This inspired Stein to abandon Communism, move to Los Angeles, and develop a proposal for a series of CD-ROM books, which he attempted to develop at Encyclopedia Britannica and Atari with little success. Stein then teamed up with an executive at Atari's parent, Warner Communications, to start the famous Criterion Collection, which still exists today. Criterion was later folded into the Voyager Company, which Stein formed in 1985. Jimmy Maher of *The Digital Antiquarian* published an extensive history of Stein and Voyager in 2021, where you can read the rest of that story.
- The final *HyperCard* stack for the *Whole Earth Catalog* came out to 9,472 pages and sold for $150 on CD-ROM. You can view that original *Catalog* at the Internet Archive.
- PROGRAMMING NOTE: I'm no longer going to cover the "Random Access" news items in the main blog. This is partly because many of the Internet Archive's recordings are reruns, which creates discontinuity with the main episode's time frame. But I will discuss news items of interest in this section as warranted.

Chapter 3: Laser Printers

Even as stock markets around the world crashed in October 1987, business owners could still take comfort in the fact that laser printers had finally broken the sub-$2,000 barrier. Hewlett-Packard's LaserJet II printer was now available from some retailers for just $1,795, a significant discount from the original $2,595 list price. And laser printers from smaller companies such as Epson could be had for as little as $1,400.

With that in mind, this next *Computer Chronicles* episode from November 1987 focused on the latest developments in laser printers. Stewart Cheifet opened the program by showing Gary Kildall some examples of printed documents. Normally you would have to go to a professional printer to get such documents, but these were all printed on a personal computer with a laser printer. Laser printers had become associated with desktop publishing. But was that the only reason to go out and buy one?

Kildall said that laser printers and high-resolution graphics went hand-in-hand. In the case of desktop publishing, the fonts themselves were the graphics. But laser printers were also good for creating presentation graphics like pie charts and bar graphs, which were useful when making overhead transparencies for business meetings. Other uses included technical documentation and engineering drawings that had a lot of fine lines to reproduce. Basically, any application where you needed to reproduce high-resolution graphics for hard copy, a laser printer was useful.

Filling a Gap in the High-End Market

Wendy Woods presented her first remote report from Laser Friendly, Inc., a Sunnyvale, California business. Woods said that the novelty of desktop publishing had worn off for most PC users who were by now familiar with the page-makeup software and laser-printer look of company newsletters. But laser technology had some distinct limitations. In terms of resolution, it had yet to approach the quality of professional typesetting.

Woods said that Printware, a St. Paul, Minnesota-based company, had found a way to break through the 300 dots-per-inch (DPI) barrier by using a radically different optical system–one that boosted resolution to 1200x600dpi. Laser Friendly, which developed high-end desktop publishing software, was one of Printware's first customers.

Laser Friendly product manager Michael Moore–no, not that one–told Woods that their company came from a professional printing background, so they needed a higher-resolution laser printer to use with their professional-grade software. But Woods noted the Printware machine wasn't cheap. Equipped with a PostScript interpreter and 2MB of memory, the Printware retailed for $16,000. On the other hand, its closest competitor ran about $30,000.

Moore said the Printware filled a gap in the market. For quite some time, professional typesetters were saying that laser printers were fine but they didn't have the resolution necessary for a lot of applications. And there was an attitude among some that there would never be a laser printer that could meet professional standards. But now there was.

Apple's LaserWriter Plus Offered a Complete Package

Jim Gable and Roy Perry joined Cheifet and Kildall in the studio. Gable was the product manager for the LaserWriter Plus at Apple. Perry was the general manager at Letraset USA, which distributed the desktop publishing program *Ready, Set, Go!*

Noting the LaserWriter Plus on the desk, Kildall quipped to Gable that it looked more like a copier than a printer. What was going on inside the LaserWriter? Gable explained the actual printing engine was, in fact, a copier. And the reason that laser printers had become so popular and low-cost was that they were based on copier technology.

In terms of what was going on inside the LaserWriter, Gable explained that instead of having a glass plate with a document like a copier, there was a laser beam going back-and-forth as directed by the Macintosh. The computer decided where the LaserWriter's 300 dots-per-inch would go. Gable noted the Macintosh was a highly integrated system and the LaserWriter Plus gave Mac users the flexibility they desired when it came to mixing text and graphics in their documents. The LaserWriter Plus had a number of built-in typefaces with no limits on size or orientation. The user therefore didn't have to load in fronts from additional cards. Nor did they need to buy a new Mac, as the LaserWriter worked the same with every machine in the line.

Cheifet asked if there were any choices when buying a LaserWriter Plus. Gable said there were two models, the original LaserWriter and now the Plus. The only difference between the two were the number of built-in typefaces. Gable added that the term "fonts" had become a bit "squirrely" when it came to describing laser printers. For example, some printers might come with fonts like Times or Courier built-in, but if you wanted the same typeface in "bold" or a certain point-size, you had to buy a separate add-on card. And the manufacturer might advertise each variant as a separate font. But when the LaserWriter included a font like Times, it came with all of the styles and sizes standard. If Apple counted each as a separate font like the competition, Gable said the LaserWriter could claim to have hundreds of thousands of "fonts."

Kildall asked Gable to show off what the LaserWriter Plus looked like inside. Gable opened the unit and reiterated that it worked much like a desktop copier. He pulled out the toner cartridge to show that it was removable. This meant that when a user ran out of toner they could just swap-in a new cartridge–they wouldn't have to pour liquid toner into the machine and get it all over the office. Kildall asked how much the replacement toner cartridges cost. Gable said it was $100 and printed about 3,000 pages. He added that many of the parts that wear out in copiers were present in the toner cartridge. So one reason the LaserWriter was so reliable was that all of those parts were contained in the replaceable cartridge. The process also didn't leave the printer's internal drums exposed, so there was no risk of scratching them.

Turning to Perry, Cheifet asked if someone who used *Ready, Set, Go!!* (RSG) needed a LaserWriter Plus to make the software work. Perry said no. *RSG* worked with either the LaserWriter Plus or Apple's dot matrix printer, the ImageWriter. The software also worked with any PostScript-compatible printer.

Cheifet asked Perry if his company was considering an MS-DOS version of *RSG*. Perry said they thought about everything. But Letraset's objective was to be the leader in graphic design software for the Macintosh. They were pleased with the graphical interface offered by the Mac.

Perry next showed a sample document printed using *RSG* and the LaserJet Plus. Cheifet asked how the quality of this document differed from one printed on, say, the ImageWriter. Perry noted the LaserWriter printed at 300dpi. The ImageWriter could only print at 72dpi.

HP's Improved LaserJet Provided Strong Software Support

Steve Simpson and John Dickinson joined Cheifet and Kildall for the next segment. Simpson was a group marketing manager with Hewlett-Packard (HP). Dickinson was an editor with *PC Magazine* and ran its PC Labs project.

Kildall noted there were only a few companies that built the engines that ran most laser printers. Both the LaserWriter Plus and HP's LaserJet II ran off the Canon engine. So were users just buying the same engine in a different package? Simpson said no. Apple and HP both used the Canon CX print engine in their previous laser printers. The LaserJet II was based on the newer Canon SX engine. The SX engine allowed HP to make several improvements over the original LaserJet, including correct-order output (as opposed to reverse collation) and a much darker print capability.

Cheifet pushed for further details on how the LaserJet II improved over its predecessor. Simpson said HP learned it had to make the product as easy to use as possible. This meant providing software support by working with over 600 vendors. It also meant making the printer easier to setup, configure, and use even if a software package didn't support it well. Simpson pointed out the front panel on the LaserJet II, which made it possible for the user to do all of the necessary configuration without having to use any DIP switches. The front panel was also used to select fonts if that feature was not supported by a particular software package.

Kildall asked what HP's customers used laser printers for. Simpson said about 85 percent of LaserJets were connected to MS-DOS systems. So it was used primarily in office environments with applications like word processing, spreadsheets, et cetera. Only about 10 percent were being used with desktop publishing applications like Aldus' *PageMaker* or *Ventura Publisher*.

Cheifet observed that the Apple LaserWriter was primarily a desktop publishing device while the LaserJet was "just" a business printer. Dickinson chimed in that "just a business printer" said a lot. The LaserJet was one important standard. But out of the 36 printers recently tested by *PC Magazine*, many were capable of emulating several other printers. In fact, 27 of those printers emulated the LaserJet and 22 of them emulated an old-style Diablo daisy wheel printer. So there was a lot of competition in this market, where businesses were looking for high speed, quiet printers that didn't disrupt the office environment.

Kildall asked Dickinson to elaborate further on the different hardware and software standards for laser printers. Dickinson said just about every laser printer on the market would work with a PC. Most would also work with a Macintosh via PostScript emulation.

Turning back to Simpson, Cheifet asked for a sample output from the LaserJet II. Simpson printed a document from Microsoft

Word. He also showed samples of desktop publishing and documentation printouts.

Cheifet noted there was a big difference in the price of an HP LaserJet and an Apple LaserWriter. What was the difference if you purchased the lower-cost HP model? Dickinson said you weren't getting all the software and processing power needed to run PostScript. On the other hand, the LaserJet had a smaller engine that was less expensive to produce.

Would "Laser Parlors" Spread?

Wendy Woods returned for her second report, this time from a "laser parlor" in San Francisco. Woods explained this was a term used to describe desktop publishing service centers. This particular parlor, Krishna Copy Center in San Francisco, and its eight franchises throughout the country, were cashing in on the complexity and high cost of desktop publishing. These parlors offered DIY desktop publishing equipment, including high-quality typesetters.

Sanjay Sakhuja of Krishna Copy Center told Woods that people wanted to invest only $2,000 to $3,000 in a computer and expected it do everything. A place like his offered the "missing links" to provide access to more expensive equipment like laser printers. A customer could use Krishna's printers as-needed and not have to buy their own.

Woods said that with a little help from qualified staff members, anyone could desktop publish and turn out professional-looking copy. (The B-roll footage showed Woods using Krishna's services to produce a flier for an event she was hosting at the upcoming COMDEX show in Las Vegas.) The cost was roughly half of what a professional typesetter would charge. And there was obviously more control over the final product. But the big question was, "Would this idea catch on with the rest of America?" Sakhuja said it was only a matter of time for this to be seen as a critical business service. Woods said that until it did catch on, however, Krishna Copy Center would still mostly rely on the photocopying part of its business for its revenues.

Okidata Emphasized Competitive Pricing

Charlie Kapeghian joined Cheifet and Kildall in the studio for the final segment. Kapeghian was director of product marketing with Okidata. John Dickinson also returned.

Kildall noted that Dickinson's *PC Magazine* recently rated Okidata's LaserLine 6 as one of its top low-cost laser printers. He asked Dickison what made the Okidata rate so highly? Dickinson said you had to understand the structure of the laser printer market. There were printers set up for desktop publishing and PostScript like the Apple LaserWriter. Then you had the high-end typesetting machines that printed out at resolutions of 1200dpi. There were also printers setup for large-scale network printing. Finally, there were the vast majority of printers like the Okidata used for work in an office environment. Most of these printers emulated the HP LaserJet. The Okidata rated high because it was highly effective at LaserJet emulation.

Cheifet turned to Kapeghian and asked him to demonstrate the LaserLine 6. Kapeghian said the printer was designed for both desktop publishing and desktop presentations. With respect to the latter, he said that users wanted the ability to merge text and graphics, multiple fonts, and large-type fonts, but couldn't afford or learn the more complex desktop publishing packages. He noted something like Aldus' *PageMaker* was designed for a very narrow segment of the market.

Kapeghian ran a self-test on a LaserLine 6 in the studio to demonstrate the printer's capabilities. He noted the LaserLine had 15 built-in fonts, while most competing laser printers between 3 and 7. There was also an optional font cartridge. He then showed Cheifet and Kildall the self-test printout, which displayed all of the included fonts.

Next, Kapeghian showed off a giant three-port interface that attached to the LaserLine. This allowed up to three workstations to share one printer. Given the LaserLine retailed for $2,395, this made the "per user" cost around $800 each, which was competitive with the price of a dot matrix printer. He also showed a floppy disk containing drivers to ensure compatibility of the LaserLine with software originally developed for dot matrix and daisy wheel printers. This software was free with the purchase of the printer.

Kildall asked about the cost of additional typeface cartridges. Kapeghian said there were about 4 or 5 available cartridges. Each cost $149. Cheifet then pointed to another Okidata printer set up on the other side of the studio. This unit included a 550-sheet second tray.

Finally, Cheifet asked Dickinson where laser printer prices were heading in the future. Dickinson said we were under $2,000 and still going down for now.

HP's LaserJet Marked Triumph of Boise Division

On June 8, 1973, Hewlett-Packard executive Ray Smelek told the local press in Boise, Idaho, that the Silicon Valley giant planned to build a "major manufacturing facility" in the city. The year before, HP established its Data Systems Division, which got the company into the business of selling general purpose minicomputers. And while HP typically designed and manufactured all of its own peripherals, it was buying printers from a third-party supplier to go with those minicomputers. So HP co-founder and president David Hewlett tasked Smelek with establishing a printer division somewhere outside of California. (Smelek selected Boise, in part, because it reminded him of his hometown of Pueblo, Colorado.)

The first printers to come off the Boise assembly line were of course dot matrix. But in late 1975, Hewlett called Smelek and told him to look at a new printer developed by the Japanese company Canon. Canon managed to adapt a photocopier engine into a laser printer capable of reproducing the thousands of Kanji characters used in the Japanese alphabet. At Hewlett's urging, Smelek entered into a partnership between Canon and HP Boise to develop this technology for the U.S. market.

It took several years, but in December 1980 the partnership produced HP's first laser printer, the HP 2608A. The new printer was quite fast for the time–outputting up to 45 pages per minute–and could print multiple fonts and graphics. Unfortunately, the 2608A cost $120,000 and only worked with the HP 3000 minicomputer. Still, HP managed to sell about 1,200 units over the 2608A's 12-year life cycle.

When it came to its next laser printer, HP considered sticking with Canon. But Canon's printer engine still relied on liquid toner. This posed a problem, HP Boise's Jim Hall later recalled, because the toner coated the printed pages in flammable liquid, which made it unsuitable for use in computer rooms. So HP decided to license its next laser printer engine from another Japanese firm, Ricoh, which used a dry toner. The resulting printer, the HP 2687A, was slower and less reliable than the 2608A, but it managed to get the price down to just five figures at $12,800.

By 1983, Canon had developed the CX print engine, which was based on a dry toner cartridge. That was good enough to lure HP Boise back and the CX engine was used to design the HP LaserJet. HP formally announced the LaserJet at the May 1984 COMDEX show in Atlanta and started shipping the printers that June.

The LaserJet beat Apple's LaserWriter–also based on the CX engine–to market by almost a year. HP initially sold the LaserJet for $3,495. But after the first 1,000 units sold, the company lowered the price to $2,995. That may still sound like an exorbitant sum, but as Ray Smelek later recounted in his memoir, it actually undercut the the more popular daisy wheel printers on the market at the time, which sold for around $3,200.

HP followed up the Laserjet with the LaserJet+ in September 1985, the LaserJet D+ in 1986, and then the LaserJet II–officially the LaserJet Series II–featured in this episode during the spring of 1987. HP set the list price of the LaserJet II at $2,495, but in practice it regularly sold at or under $2,000, thanks in no small part to price competition from machines like the Okidata LaserLine 6, which was compatible with the HP Printer Command Language.

Notes from the Random Access File

- This episode is available at the Internet Archive and first aired during the week of November 4, 1987.
- Michael Moore remained with Laser Friendly until 1988, when he left to take a position with Ricoh. He later had a stint at Apple before moving to Tektronix in 1997. Xerox acquired Tektronix's printer division in 2000, and Moore remained with Xerox in a management role until 2010. After spending several years as a consultant, Moore launched SenseMaker Studio, a content creation business, in 2022.
- Laser Friendly itself did not appear to last long. According to California state records, the business incorporated in August 1987 and was defunct by November 1988.
- Donald Mager, a former Sperry Corporation executive, started Printware Inc. in 1985. He actually licensed the technology for high-resolution laser printing from 3M, which had abandoned its own efforts to make such a printer. 3M took 20 percent of Printware in exchange for the license. A private equity firm acquired most of Printware's assets in 2000 for $2.8 million and spun it off into a separate entity, Printware, LLC, which is still in business as of this writing.
- Jim Gable eventually rose through the ranks at Apple to become vice president of software marketing. He left Cupertino in 1988 to co-found Kerbango, an Internet radio startup. After selling that company to 3Com in 2002, he briefly served as a vice president there. In 2017, Gable joined Anametric, a quantum computing startup, as its president.
- John Dickinson also appeared in the previous *Computer Chronicles* episode dedicated to laser printers , which aired in September 1985.
- *Ready, Set, Go!* was also featured in an October 1986

Computer Chronicles episode on desktop publishing. As I discussed in my review of that episode, Manhattan Graphics Corporation was the original developer ot *RSG*. It then sold the publishing rights to LetraSet USA, a division of Essette Letraset, which continued marketing the program until around 1992.

- Paul Schindler's software review for this episode was *Smart Alarms* (Imagine Software, $50), a Macintosh accessory for setting reminders.
- There was an odd error during the "Random Access" segment, which came from a June 1988 rerun of this episode. Stewart Cheifet reported that the recent release of *Dragon Quest III* for the Nintendo Entertainment System sold out its entire run of one million copies on release day and caused what one industry publication declared "the single biggest day of school truancy in the history of American schools." In fact, this happened in Nintendo's home country of Japan, not the United States. *Dragon Quest III* was not even released in the United States until 1992, where it was called *Dragon Warrior III*.

Chapter 4: COMDEX/Fall ’87

The second annual *Computer Chronicles* episode to focus on the fall COMDEX show in Las Vegas aired in November 1987, just a few days after the event concluded. Back in the San Mateo, California, studio, Stewart Cheifet and George Morrow looked at some video footage recorded on the show floor. Cheifet noted this was the biggest COMDEX ever, with the most exhibitors and attendees. But what went on at the event? Was there any buying or selling actually taking place? Or was it just PR and gawking?

Morrow said it was neither. COMDEX was certainly a social event. But it was really a networking event more than anything else, where you got a chance to see everything that has happened and will be happening for at least a little white. You got to renew your acquaintance with everybody in the industry–to look that person in the eye you wanted to buy Winchester disk drives from and ask how good they really are.

IBM’s OS/2 Announcement the Talk of COMDEX

Cheifet narrated the first remote segment from the floor of COMDEX. He reiterated this was the biggest COMDEX show ever, with over 1,500 exhibitors and 100,000 visitors. One notable returning exhibitor was Apple, which had shunned COMDEX in the past. While the company had no earth-shattering products to announce, its showroom was constantly packed with curious crowds.

For its part, Cheifet said that IBM occupied its traditionally vast floor space at the Las Vegas Convention Center and Big Blue used the event to announce a December 1, 1987, shipping date for the OS/2 operating system. Indeed, IBM’s PS/2 computer line was indirectly the focus of this year’s COMDEX, as industry observers speculated on which company would be the first to introduce PS/2-compatible chipsets and motherboards. While several manufacturers offered compatible plug-in cards for the PS/2 line, few were willing to commit themselves to more than vague predictions.

Morris Jones, Jr., of Chips & Technology told Cheifet there were several reasons for this. First, the PS/2 was a very complicated product to clone. It was taking companies longer than expected. The BIOS in the PS/2 was very large and there were approximately 70,000 gates of IBM design logic on the motherboard. Second, the PS/2 marketplace hadn't grown real significantly. It would likely take three years before the PS/2 line dominated the market in terms of volume.

Cheifet said that just below the surface of any discussion about the PS/2's microchannel architecture (MCA) and any potential clones was the legal issues–nobody wanted to be sued by IBM. Jones said his firm had discussions with IBM and he believed the company would maintain a fair policy of licensing all of their utility patents related to the PS/2. But IBM would also be "very onerous" about any copyrights in the machine's BIOS. There was always concern when dealing with IBM, Jones emphasized, as they had more corporate attorneys than most companies had employees.

Would-Be PS/2 Clonemakers Worried About IBM's Response

One potential PS/2 clonemaker, AST Research, was attempting to satisfy both IBM and customers, Cheifet noted. AST demonstrated its 386 machine with "smart slot" architecture. AST claimed that by side-stepping the CPU during data transfers, smart slot provided the multi-master functions of IBM's MCA while maintaining compatibility with older PC-AT machines.

Another potential clonemaker, Western Digital, displayed compatible motherboards for the PS/2 models 30, 50, and 60 at COMDEX. Cheifet noted that Western had not announced a formal release date for these boards yet claimed they would be

100-percent compatible and original. Roger W. Johnson, the president and CEO of Western Digital, told Cheifet that their boards used Western's own devices for core logic, VGA displays, hard disk and floppy controllers. Johnson claimed that "serious" OEM manufacturers were interested in the Western boards to build PS/2 clones.

But Cheifet cautioned that Western Digital's leap into the uncharted waters of PS/2 compatibility was bound to attract the keen scrutiny of IBM's legal department. Johnson retorted that Western had never used–or ever intended to use–IBM's proprietary information. He said that IBM claimed certain patents on the PS/2 but would not identify them specifically. Western Digital would be happy to license any such patents if necessary. And if there turned out to be anything else that was proprietary to IBM and could not be licensed, Western Digital would not copy it. He emphasized, however, that nothing in their products was copied.

Moving on, Cheifet said that PS/2 add-ins and add-ons were widely introduced at COMDEX, including some clever combinations of both. For example, Rodime Systems introducts its Double Play, a 45MB internal hard disk replacement for the PS/2 Model 50. The product was intended for OEMs and dealers and promised an access time of only 28 milliseconds, which was faster than the 20MB disk included with the Model 50. The drive also shipped with an interface card for the PS/2 Model 25.

For the 5 million PC owners not ready to trade in their machines for a PS/2, Cheifet said, Intel proposed its own solution–a 386 add-in board costing less than $1,000. Owners of 8-bit Intel 8088 machines could increase their aging PC's performance by up to 10 times, according to Intel. The Inboard 386 PC came with 1MB of RAM and software utilities to speed up screen displays and hard disk performance. Intel said the Inboard was compatible with IBM, Tandy, and Compaq machines, and would be available in January 1988.

Peripherals Not at the Periphery

Cheifet said that while it was easy to focus on the big names at COMDEX, the show was packed with smaller players whose offerings could be just as interesting. For example, Dyna Computer of San Jose, California, was ready to meet Intel head-on with a 386 motherboard replacement for PC owners. Guy Duff, Dyna's director of marketing and sales, explained the card plugged into an existing PC/XT system, so the input/output would still be at the same speed as the original XT, which was 4.77 Mhz. But this board offered a total conversion as opposed to an upgrade.

Switching the subject from motherboards to peripherals, Cheifet said that Taiwan-based manufacturer Microtek promoted its MSF-300G scanner as a big step forward for both desktop publishing and graphic arts. The new scanner, which would be available in February 1988, could scan continuous-tone photos while recognizing up to 256 shades of gray, about 16 times more than first-generation scanners. Microtek's John Kozlowski said that meant a couple of things for users. First, you could take all of that gray-level information per dot and send it out to a very high-resolution output device such as a PostScript-capable laser printer and it could interpolate it for higher resolutions up to 2,540dpi–effectively publication-quality output. A second benefit was that because the scanner captured so much gray-scale information, the user could manipulate that information using sophisticated graphics editing programs.

Another area of interested desktop publishers was laser printers, Cheifet said. One of the best-known laser printer manufacturers, QMS, unveiled a color thermal-transfer printer with 300dpi resolution and a choice of 3 or 4 color ribbons. At a print rate of 1 to 2 minutes per page, the $17,000 Color Graphics 100 was no "speed demon" compared to a laser printer, but its output was lightening fast when compared to color pen plotters and inkjet printers.

For computer owners looking for more conventional laser printers, Cheifet said, Japanese manufacturer Kyocera offered programmable integrated circuit cards that could store up to 512KB of data, anything from business forms to logos and signatures. Each IC card cost about $55 and was programmed using a “burner” attached to a PC. The printer then had a slot to download the information off of the burned card. The complete hardware and software system cost about $800.

Wireless Networking?

Local area networks got a big boost at COMDEX, Cheifet said, aided by fiber optics and cellular transmission. Sun River Corporation demonstrated its 386-based fiber optic LAN, the Cigna System, which could transmit data at 32MB/second. This was several times faster than conventional LANs and could even transmit full bitmap graphics.

RayNet Corporation introduced a different approach, Cheifet noted, by eliminating cables altogether. RayLAN was a “wireless” LAN that consisted of a PC adapter board, a receiver/transmitter, and Novell-compatible software. RayLAN would cost about $2,000 and ship in January 1988.

Cheifet said that modems also got a boost from cellular technology. OmniTel Inc. unveiled a 1200-to-2400 baud “modem on a chip” for connecting laptops to cellular telephones. OmniTel president Baldev Krishan said the product used off-the-shelf microprocessors. For a 2400 baud modem there were actually two processors: one for the microcontroller and one to handle the digital signal processing.

The Year of the Laptop

Wendy Woods took over narration duties for the next segment. Continuing from the COMDEX floor, Woods said that 1988 was already being called “the year of the laptop.” At least 14 companies at COMDEX displayed portable computers. Some packed the power of yesterday’s mainframes and ran on Intel’s new 80386. In fact, GRiD Systems had a laptop that actually ran on batteries.

But the most well-known name in laptops was Japan’s Toshiba, Woods said. At 15 pounds, the Toshiba T5100 was considered the lightest and most powerful laptop available. It whipped along at a speed 20 Mhz and came with 2MB of RAM, a 40MB hard disk, but a steep price of $6,500. And the biggest question was, "Who would buy it?"

Phil Vertin, Toshiba America's vice president of sales, answered that it came down to the limits of your imagination with respect to business applications. For instance, at Toshiba's U.S. headquarters in Irvine, California, Vertin said they took the computer to work rather than the work to the computer. He regularly brought his own laptop to meetings so that the staff could look at spreadsheets and make decisions right in the meeting.

If that much power boggled the mind and the wallet, Woods said, United Kingdom-based discount PC maker Amstrad had relief. Amstrad had some of the lowest-priced portables demonstrated at COMDEX, ranging in price from $800 to $1,000. These XT-compatibles had several features not seen before in the portable market, according to an Amstrad representative, such as a full-sized AT-style keyboard. It also worked off of regular C batteries that provided up to eight hours of power.

Woods said that as portables were becoming more versatile, so did the software. For example, Sharp Electronics offered to put custom software directly onto ROM chips used in its portable. These so-called EPROMs were available only to Sharp's corporate customers. Sharp spokesperson Bill Robinson told Woods that when a program was loaded from EPROM it came up on the screen very fast since it was effectively working at the same speed as RAM. The EPROMs were thus not subject to the kinds of mechanical failures possible with a floppy disk and were very economical.

Atari Touted Next Generation "Transputer"

And speaking of economics, Woods turned her attention to the Atari Corporation booth. Jack Tramiel's company was known for its low-priced, high-value machines. Atari brought a bevy of new products to COMDEX, including a new 80386-based PC clone, a

CD-ROM player for the Atari Mega series, and–most importantly–a new kind of computer called the Abaq Transputer.

Atari's Neil Harris explained that with the Transputer technology, you could actually plug in several microprocessor chips and have them operate in parallel on one project. Each processor could have its own bank of memory, and the CPUs communicated with one another over a high-speed serial interface. This meant that a single Transputer chip was approximately 7 times faster than the chips used in the Apple Macintosh II. You could potentially have thousands of Transputer chips linked into one machine, offering tremendous desktop computing power in the office.

Woods said that Atari planned to begin shipping the Transputer in mid-1988.

What About Software?

In terms of new software offerings at COMDEX, Woods said one highlight was *Lotus Agenda*, a personal database that the company described as "HyperCard for the PC," albeit without sound or pictures. Aldus Corporation also showed off its latest PC program, *Snapshot*, which allowed a picture taken from any video sources to be edited, placed into Aldus' *PageMaker*, or made into a camera-ready halftone on a laser printer. *Snapshot* would cost $500 and ship in the first quarter of 1988.

Intel Looked to Gain from IBM's Confusion

Back in the San Mateo studio, regular *Chronicles* contributors Tim Bajarin and Jan Lewis joined Stewart Cheifet and George Morrow. Morrow opened the COMDEX post-mortem by asking Bajarin for his thoughts on the event. Bajarin noted that at last year's COMDEX (1986), the industry was still in the midst of a downturn and there were only about 70,000 to 80,000 people in attendance. This year, however, you could tell that the industry was thriving again, because there were more people, exhibitors, and taxicab lines than ever before.

Bajarin continued that the two key themes at this year's COMDEX were graphics and communications. With respect to the latter, he quipped that every year at COMDEX was proclaimed "the year of the LAN." And we were getting closer to that being a reality. He also pointed to the fact that so many new laptops debuted. He counted at least 20 that were introduced at the show.

Lewis added that the processors and mass storage on those new laptops were of special note. Morrow proclaimed there was "finally" hard disks on the portables. Bajarin pointed to the Toshiba Model 1000 featuring a 1MB RAM card that effectively did away with the need for a 20MB hard disk. He said such RAM cards could allow you to download new software anytime you wanted. Morrow lamented, however, that the Toshiba's battery was not removable.

Cheifet shifted the discussion to laser printers. Bajarin said there were three major issues that he saw at COMDEX in this area. First, we saw the first sub-$1,000 laser printers. That was a "magic number" for the industry. And even though they were "dumb" printers only capable of printing ASCII characters, it still laid the groundwork for the future. (Lewis added this made it possible for the average person to afford their own laser printer.)

The second thing Bajarin noted was that Toshiba introduced the first PostScript-clone laser printer. He thought that would have a great impact on the market because it meant Japanese manufacturers would be able to compete with U.S. companies like Apple, Wang, and DEC, which all relied on Adobe's PostScript. Lewis noted that Adobe had been charging very high licensing fees for PostScript. And since Adobe sold PostScript to the manufacturers, that cost was marked up 3 or 4 times for the end-user. So she expected PostScript clone printers to dramatically bring down the cost of PostScript laser printers. Morrow said that once the PostScript clones lowered the price below $1,000, we'd likely see an explosion in the marketplace similar to that of VCRs.

Referencing an item featured earlier in the program, Cheieft asked Bajarin about the Intel Inboard 386 card for PCs. Bajarin said it was an interesting product. The millions of people who currently owned 8088-based PCs had been wondering whether to buy a 286 card or throw out the machine and buy a new 386. The 386 card basically allowed those users to upgrade to the latest CPU for just $995.

Morrow asked Bajarin about the prognosis for other companies manufacturing similar replacement boards. Bajarin said it would be tough. As the major supplier of the actual microprocessors, Intel would have a nice little hold on the market for now. Few competitors would be able to match Intel's $995 price point. Morrow countered that smaller competitors could still beat Intel by having lower overhead costs. Bajarin disagreed but Lewis thought that was possible.

Cheifet asked about the new software discussed at COMDEX, notably IBM's OS/2 operating system. Lewis said that was the major area of confusion at the show. She chaired the OS/2 panel at COMDEX and was still confused herself. IBM and Microsoft claimed the new operating system would "conquer the world." But software developers didn't know what to do. And while two years ago, Fortune 500 companies said they would move in the direction of OS/2 when it came out, now they were looking to convert their existing PCs using 386 boards or some similar solution. People were simply tired of waiting to see what IBM would do. And companies like Compaq had been the major beneficiary of IBM's delays.

Legal Uncertainty Over PS/2 Patents Didn't Amount to Much

IBM announced its long-promised follow-up to the original PC line–the PS/2–in April 1987. The initial reaction was largely cautious optimism. Wendy Woods' *NewsBytes* quoted one PC retailer who said, "It's a solid meat and potatoes line of computers," meaning there was "little real sizzle" but "no obvious mistakes." *NewsBytes* added that not all of the promised models were available yet, nor was the new OS/2 operating system, which was originally scheduled to launch in 1988.

Overall, IBM hedged its bets with the PS/2. There were five models announced at launch. The lower-end 25 and 30 models were basically just clones of the original PC with slightly better specs. It was the three higher models–numbered 50, 60, and 80–that featured the new Micro Channel Architecture (MCA), which was the subject of all the clone speculation on the COMDEX floor.

Chips and Technologies, one of the companies Stewart Cheifet discussed in his report, was apparently the first to actually announce a clone of the chipset used in the 50 and 60 models. At a press conference in January 1988, a C&T manager claimed their chipset was actually 60 percent faster than those used by IBM and that “even the smallest garage in Taiwan” could now assemble a PS/2 clone.

Of course, no PC manufacturers actually showed up at this press conference, as IBM was demanding steep licensing fees–as high as 5 percent of a machine’s sales price–to license its claimed patents in MCA. Kaypro Corporation announced plans to produce an IBM-licensed PS/2 clone in February 1988, but that machine never materialized. A few weeks later, in March 1988, Taiwanese manufacturer Acer debuted what was probably the first PS/2 clone to make it to market–the Acer 1030–but it was based on the Model 30, so it used the original IBM PC architecture and not MCA.

So who managed to actually clone the MCA PS/2 first? I believe the answer was Tandy. Both Tandy and Dell Computer announced clones in April 1988 based on the Chips & Technologies chipset. But Tandy actually shipped its clone of the PS/2 Model 80–dubbed the 5000MC–in July 1988. And while Dell did license the MCA-related patents from IBM, I can’t find any record of the company shipping a PS/2 clone. In any case, Tandy’s clone proved to be an expensive failure, with an initial retail price starting around $5,000, which admittedly was an improvement over IBM’s $7,000 configuration for the Model 80.

It turned out there wasn't much of a market for PS/2 clones since the PS/2 itself failed to realize IBM's goal of replacing the relatively open architecture of the original PC line with a proprietary standard strictly controlled by IBM's own patents. As Jan Lewis observed in the episode, IBM's customers were tired of waiting, both for the PS/2 and then OS/2. This wasn't 1981, when IBM faced only token competition from small manufacturers producing S-100 machines. It was six years later, and there was now not only well-financed domestic competition such as Compaq, but also the recent entry of multiple Asian manufacturers at the lower end of the 386 market.

What the Heck Was Atari Doing?

Speaking of the other end of the market, let's briefly talk about Jack Tramiel's Atari Corporation. As Wendy Woods mentioned in her floor report, Atari announced a lot of products at COMDEX. But those announcements failed to yield any notable successes.

Tramiel's biggest move of 1987 actually came about two months before COMDEX, when Atari purchased Federated Group, a small chain of electronics stores based largely in California and Texas, for $67.3 million in cash. Atari made this move for one simple reason: It needed better distribution for its products.

Neil Harris, the Atari representative who spoke in this episode, outlined a lot of Atari's distribution woes in a letter to the editor of an Atari users group newsletter that made the rounds in late 1987:

> At the time of the formation of the new Atari Corporation in the summer of 1984, the 8-bit [computer] line was not faring too well in the mass merchants. It seems that computers were neglected during the last year or so of Atari Inc. The largest companies selling the computers, such as Sears and K-Mart, had taken the position that the 8-bit Atari computers were dead, and they proceeded to close out their inventories of computers, peripherals, and software at below-cost prices.

> Compounding the situation was the set of records that were inherited by the new company. According to our books, many of the big accounts owed us millions of dollars for products shipped. According to their records, though, Atari owed them millions for products returned. When two companies have many millions of dollars in discrepancies on the books, it is very difficult to do business together. In fact, the K-Mart account was finally settled this past summer, fully three years after the new company was formed.

Harris went on to say that stores simply did not want to carry Atari's products, particularly the low-end computers, as retailers now preferred "high-end $150 game systems" from Nintendo and Sega. He insisted the Federated purchase would help remedy that, however, as these stores would now carry Atari's full line. Of course, Federated only had stores in five states at the time.

More to the point, Federated proved not to be a viable retail partner. Atari's general counsel at the time, Nicholas Lefevre, recalled in a 2015 interview with Kay Savetz of *Antic The Atari 8-Bit Podcast*, that Tramiel entered into the deal suspecting that Federated was inflating the value of its retail inventory. Lefevre said Tramiel made a "bet" with Federrated's founder and principle shareholder, Wilfred Schwartz, on this very point–and that Schwartz would have to compensate Atari if those suspicions proved accurate. Ultimately, there was litigation between Tramiel and Schwartz, and Atari ended up dumping the Federated stores two years later in November 1989.

Of course, in 1987 Tramiel was largely praised for the Federated deal. Victor F. Zonana of the *Los Angeles Times* called the purchase "a master stoke that will dramatically expand Atari's distribution for its well-regarded, inexpensive line of personal computers while enhancing Federated's ability to compete" with competitors like Circuit City. Yet even Zonana's largely glowing report noted that Tramiel had created many of his own distribution problems dating back to his "rough treatment of computer dealers while he was at Commodore." And one Atari users group member warned, "Jack Tramiel always operates in a start-up mode" and there were "always too few people doing too many jobs."

The press should have heeded the warning. Yet the buzz for Atari was strong coming out of COMDEX, particularly with respect to the announcements of the "Transputer" and a CD-ROM drive. Neither product ever made it to the market outside of a few prototypes.

The Transputer was an especially bizarre move for Atari. It was an attempt to create a low-cost professional workstation, which was about as far as you could get from 8-bit gaming machines. The first rumblings of the Transputer came around May 1987, when journalist Guy Kewney wrote in *Personal Computer World* that Atari would ship a "next generation" computer based on the Inmos Transputer chip and not the Intel 80386. Inmos was a United Kingdom-based semiconductor manufacturer. The transputer was a type of CPU designed to work as part of a parallel processing machine.

Kewney said Atari believed it could produce a transputer machine capable of four times the performance of its ST line, which were based on the Motorola 68000 family of processors. Over the next few months the rumors continued to swirl. One report said Atari would pair a transputer chip with a 68000 in a dual-processor machine. During the October lead-up to COMDEX, *NewsBytes* reported that Atari would have one machine based on a 64-bit transputer and a second that would be an "add-on box" for the Atari Mega ST, the "professional" version of the ST line.

Things didn't get much clearer at COMDEX. Atari did show off a demo unit of a $3,000 transputer-based microcomputer it dubbed the Abaq. But there was no operating system. It was still in development by an outside contractor, United Kingdom-based Perihelion Software. And there were rumors circulating on the floor that Tramiel met with Steve Jobs to discuss a joint venture between Atari and NeXT, Inc., with regard to transputer technology. That rumor proved fruitless, but it suggested that Tramiel might have been starting to lose confidence in the project.

Indeed, in December 1987, Inmos laid off most of its staff in the United States and consolidated its operations in the United Kingdom. Delays followed at Atari. While the company continued to show off its prototype at European trade shows in early 1988, that July Atari announced shipments would be delayed until "at least 1989" due to the fact the operating system still wasn't ready.

Around May 1989, Atari did finally ship some workstations, although the name had been changed from Abaq to the Atari Transputer Workstation 800. Only about 350 units were ever produced. But at least the operating system–dubbed Helios–was finally done.

Notes from the Random Access File

- This episode is available at the Internet Archive and was initially broadcast during the week of November 11, 1987.
- Paul Schindler's software review for this episode was *Klondike 3.0* (Computing Capabilities Corporation), a $50 solitaire program for the Apple Macintosh.
- Roger W. Johnson was originally from Hartford, Connecticut. After working in executive roles at companies including Memorex, General Electric, and Burroughs, he joined Western Digital as its president in 1982 and became CEO the following year. A self-described "Eisenhower Republican," Johnson endorsed Democrat Bill Clinton's 1992 presidential campaign. Clinton later appointed Johnson to serve as head of the General Services Administration during his first term. After resigning from the GSA in 1996, Johnson officially switched from the Republican to the Democratic Party. He passed away in 2005 at the age of 70.
- Phil Vertin left Toshiba America in September 1989 to join rival Japanese electronics giant Samsung, where he eventually became general manager of Samsung Information Systems. Vertin died in March 2020 at the age of 86.

- Baldev Krishan founded OmniTel in 1984. After leaving the company in 1991 he went on to found several other startups, including Novalink, Encanto Networks, and Smart Embedded Systems. He is currently the CEO of iVALT, an online identity validation service.
- This was Neil Harris' second appearance on *Computer Chronicles*. He was last seen in a July 1987 episode talking about Atari Corporation's use of Taiwanese manufacturers.
- Among the highlights not featured in the *Computer Chronicles* coverage of COMDEX: Jan Lewis' Palo Alto Research Group holding a Tuesday night party that included free foot massages.

Chapter 5: Local Area Networks – IBM Compatibles

Local area networks were a regular topic during early seasons of *Computer Chronicles*. In a first-season episode from 1983, 3Com's Ethernet was still "under discussion" as a possible industry networking standard. In 1985, IBM tried–and ultimately failed–to gain control of the standard with Token Ring. Now, with this next look at networking from November 1987, the topic had grown so much in complexity that this would be the first of a two-part series. This first episode focused on networking technology for IBM PCs and compatibles, while the next program addressed the state of LANs on the Macintosh.

Stewart Cheifet opened the program by comparing a computer network to a television network. He showed this week's co-host, George Morrow, two organizational charts: one for PBS and the other for a corporate local area network (LAN). Cheifet asked Morrow if the introduction of Intel 80386-based PCs meant it was now easier and cheaper to get into a network. Morrow said it sure was. He said this new generation of machines would move the price-performance points of network systems. The 386 processors were powerful enough and the input/output buses were designed to move data on-and-off a network and onto a disk very fast.

Cheifet asked about the Macintosh II. Morrow said it was also a very capable networking machine. The Macintosh's Motorola 68000 processor family was just as capable as the 386. And the new system bus on the Mac II was also quite fast.

San Francisco Suburb Moved from Pneumatic Tubes to Token Ring

For her first remote segment, Wendy Woods narrated B-roll footage taken at the City of Concord, California's city hall, which used an IBM Token Ring network running on a Burroughs Corporation mainframe. Woods joked that the closest thing to a network this small San Francisco suburb used to have was a pneumatic tube system–a reliable but limited solution to the problem of moving documents between different offices. But today, computer networks were transforming city government department-by-department.

LeRoy Tavares, the microcomputer coordinator for the City of Concord, told Woods that initially it was "desktop productivity" needs, such as putting out word processing documents in a consistent format, as well as preparing budget spreadsheets and list maintenance, which spurred the move towards computer networking. Typically, Tavares said each department had files and records that weren't that relevant to the other departments. So it was useful to have a means of centrally accessing all of those records without the need for keeping boxes of paper files and their associated indexes around in separate departments.

Woods said that at the city clerk's office, the public works department, and central word processing, Token Ring networks had simplified the complexity of storing, finding, and changing documents that were handled by many people. The bureaucratic process seemed well-suited to the network's functions. Tavares said that for example, if there was a city code violation, you might have different people reporting, recording, and resolving the matter. So it was useful to have an electronic system to look everything up.

Concord's networks were not yet interlinked, Woods noted. Each department had its own system and file server. In some departments, where the network's use was limited to transferring files and sharing peripherals, computers were linked together using just a simple RS-232 smart connector. And while most workers had adapted to the network system, some paper backup files were still used.

Woods added that making user software as friendly as the traditional index cards used in paper filing hadn't always been easy. Tavares said applications designed for the network weren't too difficult. But applications designed for a single-user network with added multi-user functionality required some "creativity," since many features of the network could only be activated at the command prompt level. He said the next step was for software developers to come up with a consistent look and feel that made sense to people. Tavares cited the telephone system as an example. You were used to the idea of a prefix, telephone number, and extension to identify individuals within a telephone network. That was a metaphor people understood.

Distributed Networking Over Grapevine

Kenneth Scott joined Cheifet and Morrow in the studio for the next segment. Scott was president of Computer Pathways, Inc., which developed a LAN product called Grapevine. Also present was Computer Pathway's vice president for marketing, who did not speak but was simply there to operate another computer as part of the in-studio demonstration.

Morrow asked Scott to explain Grapevine. Scott said the name was chosen because it suggested people should know how to use the product. Grapevine was designed to be a LAN product for the typical PC user, i.e., someone who used a computer for spreadsheets and word processing.

Morrow noted that Grapevine's approach to networking was different than the traditional file-server model. Scott said Grapevine offered the ability to put the server function into each computer on the network. Each workstation could therefore act as a server for any other machine on the network. It was therefore a distributed network.

Scott then provided a demo of Grapevine. There were three machines–all XT- and AT-compatibles–setup in the studio running Grapevine. The other Computer Pathways executive ran a word processing program on one machine, while Scott had a Compaq Portable running a database and a third PC on the desk running *Lotus 1-2-3*. Scott noted that you could have up to 50 machines (or "nodes") spread out over a distance of up to 4,000 feet running on a Grapevine network.

Scott explained that networks offered the capability of sharing physical resources (like printers) and files, and provided communications between members of the network. He noted that normally you had to exit an application like *1-2-3* to bring-up network functionality. But with Grapevine, you could continue working in Lotus and access the network by pressing one key. Pressing that key brought up by a menu showing several printers that were available on the network. You could even select specific printer options, such as whether you wanted a letter- or draft-quality printout. There were additional options for showing and managing the queue for any selected device on the network.

Scott explained that Grapevine allowed for "drive substitutions," i.e., assigning a drive letter in DOS to the other hard drives access through the distributed network. Morrow asked about the "file lockout" problem: If one user accessed a file, could another user access the same file at the same time? Scott said in a multi-user application there would be a locking provision to prevent this. But in a single-user application it was possible for both users to gain access to the file. So this was dictated by the application involved rather than Grapevine. But Grapevine did include security features so that each user could lock out their own disk drive or some portion of the drive. The user could also grant "read only" access to selected files.

Next, Scott demonstrated the e-mail functions of Grapevine. (Keep in mind, this is e-mail only within the local network.) There was a standard e-mail form that could be used to create things like inter-office memos. He added that this entire time, the computer was still running *Lotus 1-2-3* in the foreground. You didn't have to leave your application to access any of the networking functions.

Morrow noted that *1-2-3* ran under MS-DOS. So what was the relationship between Grapevine and DOS? Scott replied, "Intimate." Elaborating further, he explained that Grapevine functioned as a RAM-resident process. It effectively functioned like a multi-tasking operating system that viewed DOS as just one "task."

Cheifet asked about the benefits of Grapevine's approach to networking versus the traditional, first-generation approach of using a file server. Scott said there were several advantages. One was that you avoided the congestion that was inherent with a dedicated server. With a server, the more users you had, the more traffic that flowed into the server, which degraded network performance. A second advantage to Grapevine was that it allowed you to distribute your physical resources in a more realistic and pragmatic fashion. Scott noted that his own company had about 20 users at a given time and they had yet to see any performance problems. Morrow added there was an advantage to letting a user move files they were using to their local machine rather than having to rely on a central file server.

Cheifet asked Scott to clarify exactly what came with Grapevine. Scott said it was a combination of hardware and software. The hardware was a single expansion card inserted into each PC on the network. (Morrow was impressed the Grapevine card didn't seem as crowded as an IBM Token Ring or Ethernet board.) The actual connections could be made with either coaxial or twisted-pair cables. The software came on a single 5.25-inch floppy disk and required a system with 128KB of RAM.

Computer Associates Divided Between 3Com, Novell Networks

Wendy Woods presented her second remote report from Computer Associates International (CA), then the world's largest software company, and the complex network it used at its offices in San Jose, California. Woods said that all of the company's programmers, engineers, and quality control staff worked on computers networked through a 3Com LAN. This enabled the staff to program and communicate far better than if they were on standalone terminals.

Dave Montagna, CA's vice president of engineering, told Woods that by working with the network they were able to share data. So one person could be working on a feature for a program and add that to the work done by the other programmers. The developer could then test their new code right away against the latest version that everyone else had. Quality assurance could similarly perform its own. Basically, everyone could work on the same code without having to manually copy files onto floppy disks and pass those disks along to the next person.

In addition to three file servers acting as the “traffic cops” for the department’s 70 computers, Woods said, the network also had so-called CPU servers–powerful jobs to which jobs could be off-loaded. (I believe these are now just called “build servers.”) These machines could compile code and do number-crunching, freeing a programmer’s individual machine for other tasks. Leslie Levey, a development manager at CA, told Woods that the build server included tools to track ongoing jobs, files, and provided e-mail service. Woods added that by working on a local area network, programmers received firsthand experience programming for LANs, which enhanced the 100 or more products that CA created.

In another part of the San Jose office, Woods said, customer service and accounting staff worked on a Novell-based LAN. This network tracked CA’s telephone support operation, tracking a ticket from the time of a customer’s call to its outcome. Eventually, CA wanted to link the customer support and software engineering networks. This would make it possible to share bug reports and customer suggestions for new features. Right now, this information had to be transferred between departments on paper. And despite the efficiencies of the network, programmers also relied on personal interactions to exchange ideas in face-to-face meetings.

EasyLAN Offered a Cheaper Approach to Basic Network Functionality

Bill Myers and Dick Kent joined Cheifet and Morrow for the final segment. Myers was the sales director with Server Technology in Sunnyvale, California, which produced EasyLAN. Kent was president of DLM Consultants, Inc., in Santa Clara, California.

Cheifet noted that Myers' EasyLAN had a "zero-slot" or RS-232 approach to local area networking. What exactly was that? Myers said EasyLAn was a low-cost network alternative. But low-cost didn't mean less functional. EasyLAN relied on RS-232 connectors, which was the serial port built-in to just about every PC and PC compatible on the market. EasyLAN used a combination of software and serial cables to create a network.

Morrow asked about EasyLAN's capabilities with such a setup. Meyers said EasyLAN provided the "important functionalities" that users tended to look for first in a network. This included sharing expensive peripheral devices like laser printers and exchanging files. Morrow noted that EasyLAN did not, however, provide for real-time sharing of files. Myers said that was correct. But EasyLAN could run alongside another network that provided such functionality.

Cheifet turned to Kent and asked him to compare the approaches of different types of LANs. Kent said the RS-232 approach used by EasyLAN offered an advantage with respect to cost, about $100 to $200 per node. A traditional network like 3Com or Novell required network interface cards that ran about $300 to $500 each, as well as a network operating system that cost between $2,000 and $3,000. (So about $1,000 per node, Morrow observed.) The traditional networks could also run multi-user programs, which EasyLAN could not.

Morrow asked about the security of these higher-end networks. Kent said that involved two issues. The first was unauthorized access to the network and its data. The second was the integrity of the data in the event of a system crash or power outage. With respect to the latter, Kent said that anyone with a dedicated file server should have an uninterrupted power supply (UPS) to protect against a brownout and blackout. A UPS would give you at least 20 minutes of emergency power to safely power down the server. If you didn't have a UPS, the network operating system could provide some forms of protection such as duplicate directories, disk mirroring with two separate disks, or redundant hardware.

Following up, Morrow asked about the resilience of these networks if one of the nodes went down. Kent said a lot of work had been done in this area. The old effect of a ring network–where one node could bring the entire system down–didn't exist today. The problem was now that the network would slow down significantly, responding in minutes rather than seconds.

Cheifet asked Myers how the LAN market was segmented. Myers said that someone looking at a network had to first assess their objectives. That started with the basic functionality that he previously described, and then you could get into the higher-level functionality. In other words, you started with resource sharing, then file sharing, and then you could think about moving onto multi-user applications. EasyLAN provided a product at the lower end of that functionality. Other products addressed the whole spectrum.

Server Technology Now Powers Data Centers

The bulk of this episode focused on smaller local area network offerings. And neither of the featured products–Grapevine and EasyLAN–seemed to have survived much past the late 1980s. Grapevine debuted in April 1987. It was originally priced at $595 per station, which included both the software and the networking card.

I couldn't find out much about the company behind Grapevine, Computer Pathways, Inc. It was based out of Washington State. But I was unable to find any specific records of the company's existence. Based on the history of the "Grapevine" trademark, however, it appears that Computer Pathways ceased active business operations sometime around 1992.

As for EasyLAN, the company behind that product–Server Technology–is still around. Although the modern Server Technology is known for producing power distribution units for servers as opposed to server-less networking options for PCs. Carrel W. Ewing, an engineer who started his career at IBM, founded Server Technology, Inc., in 1984. EasyLAN was apparently the company's first product. It came onto the market in 1985.

Hank Bannister, reviewing the initial release of EasyLAN for *InfoWorld*, noted the system offered decent value even if it was slow by networking standards of the time:

> Although password protection of files is available, the program does not have any multiuser capability and does not perform file or record locking. That's just as well, because the transfer of data is limited to the 19,200-bit-per-second speed of the RS-232 cable, an order of magnitude slowed than even Appletalk, the slowest of the major networks. […]
>
> The second limitation is an incapability to daisy-chain computers. Instead, a star configuration must be used, with one computer acting as a hub; the connected computers can talk only to the hub computer, not to one another. Also, only two to 10 computers can be connected; most business offices, [Carrel] Ewing says, have four to six computers in one location.

So in that sense, Grapevine probably would have been a more robust choice in 1987, as it could network up to 30 computers and its distributed networking model did not require a "hub" computer. That said, Server Technology apparently did well enough with EasyLAN to continue iterating on the software until at least the early 1990s. I found one reference in a 1992 *InfoWorld* article to EasyOffice, which was Server Technology's more recent low-cost networking solution and it continued to use EasyLAN as the software.

By this time, however, Server Technology had begun transitioning into the remote power management products business. That began in 1990, according to an old version of the company's website. In 2000, Server Technology relocated from California to Reno, Nevada, and become a major player in providing power distribution to data centers.

Carrel Ewing continued to serve as the company's chairman and CEO until his death in June 2013. Ewing's son, Brandon Ewing, the company's president since its founding, took over as CEO. In November 2017, French industrial conglomerate Legrand acquired Server Technology. As of this writing, Brandon Ewing continues to run the business as an independent subsidiary under Legrand's North & Central America division.

Notes from the Random Access File

- This episode is available at the Internet Archive and first aired during the week of November 18, 1987.
- Paul Schindler reviewed *MemoryMate* (Broderbund Software, $80), a memory-resident note-taking program for MS-DOS computers. Schindler noted the program could perform a full-text search of 180,000 characters in just 3 seconds.
- Dick Kent ran DLM Consultants, Inc., from 1980 to 2007, according to California state corporation records.
- George Morrow, who co-hosted this episode, actually worked for another company in the LAN business during this time period. After the closing of Morrow Designs in 1986, Morrow started a new company called Intelligent Access to develop disk controllers. Morrow sold Intelligent Access to DSC Nestar in early 1987. Nestar Systems, founded in 1978, was one of the earliest LAN manufacturers. Digital Switch Corporation (DSC) acquired Nestar in 1986. And after buying Intelligent Access, Morrow served as DSC Nestar's chief scientist for a brief period.
- Erik Sandberg-Diment of the *New York Times* used his December 1985 review of EasyLAN as a platform to rant about the poor state of software documentation. Specifically, he complained that EasyLAN's manual lacked an index. Sandberg-Diment passed away in 2018. No doubt he was even more irate at the state of software documentation–or complete lack thereof–by the mid-2010s.

Chapter 6: Local Area Networks – Apple

Apple had a few false starts when it came to local area networks in the 1980s. In February 1983, the company announced AppleNet, which it described as a “scaled-down version” of Bob Metcalfe’s Ethernet standard. The idea was that AppleNet would offer a decentralized LAN that didn’t require a full server and could connect up to 128 Apple II, Apple III, or Lisa systems across a distance of up to 2,000 feet. Apple claimed this approach would make its LAN more affordable, with a per-node connection cost of under $500. The trade-off was that AppleNet would be slower than other Ethernet LANs.

Apple promised that AppleNet would ship sometime in late 1983. But that never came to pass. The system was seen for the first–and apparently only time–in public at the June 1983 National Computer Conference in Los Angeles, California. But four months later, in October 1983, Apple said “never mind” and canceled AppleNet.

There were a couple of reasons for the about-face. First, AppleNet was tied to the Lisa, which was also introduced in 1983 and quickly proved to be an expensive failure. Second, there was still uncertainty within Apple as to which networking standard to use. Apple chairman and co-founder Steve Jobs believed that Ethernet was the wrong way to go and felt the company should instead back IBM’s Token Ring networking standard. (In fairness to Jobs, a lot of people thought IBM would win this battle.) So after the Macintosh launched in early 1984, Apple announced AppleBus, which made it possible to create a LAN of up to 32 Macs or Lisas over 1,000 feet using serial cables and a $25 add-on box. Jobs dubbed this low-cost solution “free net” to the press.

Jobs also promised that AppleBus would be fully compatible with Token Ring. Of course, he said this before Token Ring was actually on the market. As *InfoWorld*'s Jim Bartimo noted, “How does Apple plan to be compatible with a network that doesn't exist yet?”

Indeed, Token Ring didn't ship until late 1985. So Apple needed to revise its networking plans yet again. In January 1985, the company announced its “Macintosh Office” strategy. This was based on the existing AppleBus protocol, which had been renamed AppleTalk (and later AppleTalk Personal Network). Macintosh Office initially focused on networking multiple Macs to the LaserWriter printer. But there would also be a central file server equipped with a 20- or 40-MB hard disk drive. This was important because the original Macs did not ship with hard drives.

But the file server wasn't actually ready in January 1985. Apple promised it would ship that fall. Except that didn't happen either. As 1985 bled into 1986–and Apple CEO John Sculley prevailed in his internal power struggle over Jobs–there were yet more delays in actually shipping a file server. It was not until January 1987 that Sculley announced (or rather re-announced) that an AppleTalk file server would finally be ready that May.

The new server, dubbed AppleShare, actually did ship, although not as a standalone piece of hardware. Rather, AppleShare was software that could be installed on an existing Mac to convert it into a dedicated file server. In May 1987, Apple also announced EtherTalk, an Ethernet adapter that made it possible to link IBM PCs and compatibles to an AppleShare server.

Which brings us to this November 1987 *Computer Chronicles* episode looking at how Apple's fancy new networking setup worked. This was the second in a two-part series, with the previous episode focusing on lower-cost LAN solutions for the PC market. The episode began with Stewart Cheifet and co-host George Morrow demonstrating one of the “original” forms of networking–talking over two cans connected by a string. On a more serious note, Cheifet said that a better analogy for a computer network was the telephone system. Morrow agreed, noting the original phone system was based a “party line” network where you had multiple telephones connected to the same line. That was similar to the bus structure of today’s LANs, where multiple computers were connected to the same wire. And much like when there were multiple telephone companies that made it difficult to call between different systems, there were now multiple competing standards for computer networks, making it difficult for different machines to talk to one another.

Big Eight Accounting Firm Beta Tested Hybrid Network

Wendy Woods presented her first remote segment, narrating B-roll footage taken at the San Jose, California, branch of the accounting firm Arthur Young & Company, then one of the so-called Big Eight financial services firms. Woods said the firm faced some “special problems” when it came to building an integrated computer network. Incompatible hardware had to be divided into incompatible networks on three different floors of the office. On the eighth floor, Macintoshes were everywhere, but on the lower floors, IBM compatibles had the upper hand.

Today, Woods said the company was tasting a new gateway that allowed any user to communicate with any part of the network. Chris Veal, Arthur Young’s western regional director, told Woods that they were addressing the ability to take an existing network for a single environment–DOS–and gateway that into the Macintosh world. That meant using a dedicated MS-DOS machine that had both ARCnet and an AppleTalk cards. (ARCnet was an older networking standard that predated the IBM PC and Ethernet.) This machine could therefore talk to both networks and effectively created a seamless network on either the PC or Macintosh side.

Woods said that 3Com file servers presently linked different machines and different networks over telephone lines while the so-called interbridge talked to all of the networks. But the decision to keep different machines led to frustrations and delays. Veal said the biggest problem was coming to terms with the true capabilities of the network and not pushing the system beyond what it was expected to do. The problem used to be things like corrupted data and file allocation tables going out of whack. Now, the main problem was expending a lot of time trying something that was never intended to work and dealing with the consequences if it didn't work.

Indeed, Woods note that the Mac-to-IBM gateway was not yet perfected. It took several tries to transfer a file for an on-air demonstration. But the appeal of the concept was undeniable. Through the interbridge, a user could retrieve a formatted document or send a memo or electronic mail anywhere on the network.

Woods added that at Arthur Young, Macintoshes outnumbered IBMs, which was still an unusual sight in the business world. It was common to see accountants lugging Macs back into their offices from field trips to see clients. And despite some persistent bugs in the IBM-to-Mac network, the firm planned to expand its system to provide network access from remote locations–and ultimately a wide-area network to link offices around the world.

AppleShare Turned Mac II Into File Server

Chris Bryant, the workgroups manager at Apple, joined Cheifet and Morrow for the next two segments. This first segment focused on AppleShare. Morrow opened by noting that networking was built-in to the Mac when it first came out but a lot had happened since the January 1984 launch. Where did things stand now with the Macintosh II? Bryant said the company had moved from the initial implementation of the AppleTalk Personal Network to add a number of additional services, including the AppleShare file server.

Bryant said that one of the first things that users noticed about file servers was that they were different to use than their local computers. But one of Apple's priorities was making the AppleShare server as transparent as possible to the user, i.e., to make it as close to using their local machine as possible.

Bryant then explained the setup for his demonstration of the AppleShare file server. On the desk in front of him was a Macintosh II workstation with a color monitor that was connected to the file server over the network. On the other side of the studio, another Apple executive operated a second Macintosh II running AppleShare, a LaserWriter Plus printer, and a Macintosh SE workstation that was also connected to the server.

On his Macintosh II, Bryant opened the file manager to show the files and subdirectories on his local hard disk. He clicked the icon for the AppleShare volume, which opened a second window displaying the contents of the AppleShare server. He noted that the representation of both the local and network drives were nearly identical.

Morrow pointed out that one of the folder icons in the AppleShare window was gray. Bryant said that was a metaphor for resources that the user could not access. Cheifet asked why the user didn't have access. Bryant said it was because the "owner" who had control over giving access kept that file private. In fact, he pointed out this particular gray icon represented a "drop" folder. The user could make changes to that folder but not see what was inside. This was useful in a situation like submitting status reports to a manager. Employees could add their reports to the folder, but only the manager could see them.

Morrow observed that a user-friendly system would make it possible to move an item from the local window to the file server window. Was that possible? Bryant said it was and he did just that. Morrow was suitably impressed. Cheifet asked for a reverse demonstration from the operator on the second workstation. Bryant showed that when the operator created a file on his machine, the icon then showed up on Bryant's workstation. The other operator also showed how you could control access to a file using a separate menu.

Morrow asked how all of this information appeared on the file server. Was it the reverse of how it looked on the local workstation? Bryant noted the file server was dedicated to that purpose. A dedicated server maximized network performance for users. The server could run additional services such as LaserShare–Apple's print spooling software for the LaserWriter–but not user applications. Bryant added that the decision to implement the file server on standard Macintosh hardware was a plus because as users needs grew they could easily upgrade the server.

Cheifet asked if you had to use a Macintosh II as the file server. Bryant said that AppleShare would run on a Macintosh Plus or a Macintosh SE, but the Macintosh II offered better performance and expandibility. Morrow clarified there was no structural difference between the Macintosh II used as a file server and one used as a workstation. Could you use a single machine as both? Bryant said it was possible but there would be issues, especially when trying to run applications on a server.

EtherTalk Connected Macs and PCs

For the next segment, Bryant showed how you could connect a Macintosh to an IBM PC or compatible. Cheifet asked about the networking protocol. Bryant said the Macintosh II on the desk was connected to the file server using EtherTalk. On the other side of the studio, a Macintosh SE and a Compaq Portable II were connected using the AppleTalk Personal Network, which was a lower-cost implementation with lower speed. Bryant explained that the AppleTalk protocols were designed into every Macintosh and LaserWriter. So the user interface was consistent across the Macintosh line regardless of the protocol used.

Cheifet asked for a demonstration of the Mac and Compaq Portable II working together. As a second operator worked the Compaq, Bryant explained that when a PC user accessed the Apple file server, it saw the directory structure as if it were a DOS machine. (In other words, it represented the file system using letters for the disk drives.) Bryant noted that the system even automatically shortened the names of longer Macintosh files to comply with the more limited 8.3 MS-DOS nomenclature structure.

The operator launched *Lotus 1-2-3* on the Compaq and made changes to a spreadsheet. Bryant said he could then open that same document in *Microsoft Excel* on the Macintosh II. *Excel* automatically converted the file. Bryant then created a graph in *Excel* using the converted data.

Morrow asked about the cost of this approach to networking. Bryant reiterated that the hardware and software protocols required for networking were built-in to every Macintosh and LaserWriter. All you needed to connect workstations over the AppleTalk Personal Network was a $75 connector per node.

Stanford Building the First Blocks of the Internet

Wendy Woods presented her second remote segment from Stanford University in Palo Alto, California. Woods noted that Stanford had one of the largest campus computer networks in the United States, comprised of some 1,300 computer ranging from Macintoshes, sophisticated workstations and PCs, to Digital Equipment Corporation VAXes, MicroVAXes, and IBM mainframes.

All of these machines talked to one another via the Ethernet-based network, Woods said. In various closets across campus you could see the gateways and repeaters–in lay terms, the "traffic cops" that made the system across the vast distances requires. This network even extended into the dormitories, where students could access bulletin boards, job banks, and even the full bibliographic holdings of the Stanford University library system. Students could also do assigned courses in programming and send e-mail to instructors.

Bill Yundt, Stanford's director of networking, told Woods that tying all of the diverse systems together required some trade-offs. He said the university had to write software for the Macintosh that ran in a compatible fashion with the other machines on the network using the TCP/IP networking protocol. That allowed a Macintosh to sit on an AppleTalk network and connect to the

Ethernet-based networks such that the Mac looked like it was physically connected.

Woods noted that Macintoshes were slow and only had single-tasking operating systems. But students loved them. They were easy to operate and good teaching machines. The most common use for Macs were in classrooms, where small local area networks could share software programs stored on a dedicated file server. So far, French, history, and computer literacy were taught this way.

Linking all computers on campuses was an increasing phenomenon throughout the nation's top universities, Woods said. MIT and Carnegie Mellon were two other examples. But Stanford officials said they were ahead of the rest because they found a way to make their network useful for top researchers and freshman students alike.

Was the "Age of Intelligent Network Managers" Coming?

For the final segment, regular contributors Jan Lewis and Tim Bajarin joined Cheifet and Morrow. Cheifet noted that there were still a lot of user complaints about the complexity, speed, and reliability of local area networks. Had we actually made much progress in this area? Lewis said we had, although there was a still tremendous way to go. It also came down to perspective. If you worked in an environment with a lot of different architectures and machines, the types of connections we had now were still inadequate. On the other hand, if you were in a department where some people used IBMs and some used Macs, a product like AppleShare allowed them to share files in a way that was not possible a couple of years ago. Lewis added that Apple's implementation of AppleShare was truly elegant in terms of the user interface.

Bajarin said AppleShare was an indication of where things were headed in the future in terms of developing "intelligent network managers." In order to see this kind of inter-connectivity work, we would need to see LANs working closely together with a much cleaner user interface and a lot of power. He agreed with Lewis that perspective also mattered. If you came from a mainframe or minicomputer environment, than today's LANs had not come far enough. But if you were in a microcomputer environment where you couldn't connect different machines at all two years ago, these LANs looked wonderful.

Morrow asked if Microsoft's forthcoming Presentation Manager for OS/2 would offer an environment that makes LANs for the PC as natural as what we've seen from Apple? Bajarin said probably, although the big issue there would be memory. Software like Presentation Manager and Windows required a tremendous amount of both memory and CPU power to function together with networking protocols.

Apple Opted for More Expensive "Authoritarian" Approach to Networking

As I discussed in the introduction, it was a long road getting from Apple's 1983 promise of a low-cost, low-speed LAN to shipping AppleShare more than four years later. Not that John Sculley didn't take a victory lap after crossing the finish line. Announcing the re-launch at Jonathan Seybold's first Desktop Communications Conference in late January 1987, Sculley proclaimed that AppleShare was "just as significant as the original Macintosh" and that the project's chief engineer, Gursharan Sidhu, would be "recognized as a folk hero for what he has done."

AppleShare was definitely the talk of the Seybold Conference. But not all the talk was positive. John Markoff, writing for the *San Francisco Examiner*, said the "self-congratulatory mood" surrounding Apple "tended to obscure" the substantial delays in the project. Markoff said Bill Gates, a "staunch Apple ally," noted that "while Apple has a clear lead in the desktop publishing market, many of the computer communications products it just not introducing have been available for IBM PC's for several years." (Of course, Microsoft was no stranger to long-delayed releases of what turned out to be underwhelming technology, such as the OS/2 Presentation Manager that Tim Bajarin referred to in the future tense in this episode.)

Markoff also said that some analysts and vendors were unhappy with the "authoritarian" approach Apple decided to go with by having a single file server as opposed to adopting a more decentralized approach to networking. We saw some examples of low-cost, decentralized networks in the previous *Chronicles* episode focusing on the PC platform. And in fact there was an October 1985 episode where Nat Goldhaber of Centram Systems West demonstrated his company's networking product, *TOPS*, which made it possible to create a distributed file-server environment to network both Macs and PCs. Goldhaber was understandably miffed that Apple was now marketing a direct competitor to his product and he told Markoff it was somewhat ironic given that Apple originally contracted him to develop *TOPS* before deciding to pursue AppleShare.

It's also worth noting that AppleShare was far removed from Apple's "low-cost" LAN dreams of 1983. The AppleShare software was $799, which actually was quite reasonable for the time. But you also needed to purchase a separate Macintosh with a hard disk to run as the file server, which you didn't need to do with something like *TOPS*. Even if you purchased the lowest-end machine capable of running AppleShare–a Macintosh Plus–that would have run about $3,200 with the hard drive in mid-1987. And that's before you factored in the per-node costs and any other add-ons, such as the EtherTalk card, which originally retailed for around $700.

Notes from the Random Access File

- This episode is available at the Internet Archive and first aired during the week of November 25, 1987. The recording on the Archive is a rerun from the week of March 17, 1988.
- Paul Schindler reviewed *Webster's Electronic Thesaurus* (Proximity Technology, $90), which is exactly what you

think it is.

- Arthur Young & Co. merged with Ernst & Whitney in May 1989 to form Ernst & Young. At the time of the merger, there were eight major professional service firms. Today there are just four, including Ernst & Young.
- Bill Yundt worked for Stanford University for 25 years. While still at Stanford in 1989, Yundt took over as CEO of BARRnet, one of the earliest Internet access providers in the San Francisco area. Stanford sold BARRnet to BBN Corporation in 1994. Barr stayed on as a vice president with BBN until 1996, when he joined WebTV Networks, which was later bought by Microsoft and turned into MSN TV. Barr remained with Microsoft until his retirement in 2001.
- Yundt referred to Stanford creating software to join their computer networks using TCP/IP, which is the foundational protocol for the Internet. The software was originally developed by William Yeager, a research engineer at the Stanford medical school, according to a 2002 article by Pete Carey of Knight-Ridder. As the software became the campus standard, another group of Stanford staffers decided to develop their own routers incorporating Yeager's work. These staffers would leave the university and form Cisco Systems, Inc. Carey said that Stanford officials contemplated legal action to stop Cisco as they had effectively stolen the university's IP. Yundt told Carey he favored licensing the software to Cisco instead, as Stanford couldn't enter the commercial router market anyways, and that was what the university ultimately did in April 1987.
- Over time, the AppleTalk protocol was superseded on the Macintosh by the TCP/IP standard as the Internet came into its own during the 1990s. But Apple continued to develop AppleTalk up through the release of the first OS X in 2001, and it retained legacy support through the release of version 10.6 in 2009.

Chapter 7: Consumer Buyers Guide 1987

The November 1987 edition of the *Computer Chronicles* holiday buyers' guide began with Gary Kildall showing Stewart Cheifet the Sony XV-T600 Picture Computer, a $600 machine that added pictures and titles to home VCR movies. It also came with a small handheld scanner. Kildall demonstrated how you could place the scanner over a black-and-white drawing and digitize the image so it would appear on an attached television screen. The controls on the scanner could then be used to fill in the colors on the image. (You could also use a trackball, Kildall noted.) The color palette appeared on the lower right-hand corner of the television screen. The completed color image was then added on top of some video of a recent trip that Kildall had taken to New York City.

Computer Retailers Nervously Optimistic

Before spending the remainder of the episode on holiday gift recommendations, there was first the obligatory remote segment of Wendy Woods narrating B-roll footage taken at a local mall in northern California. (My best guess is that it was the Bay Fair Mall in San Leandro.) Woods said that for almost every retail store, Christmas was the biggest selling event of the year. The colorful decorations were vivid reminders of the commercial importance of the holidays, and 1987 was no exception.

Nervous computer retailers were watching carefully to see if Wall Street's October crash was a harbinger of bad times, Woods said. But that didn't seem to be the case, at least for now. Daniel B. Williams, vice president of the retailer Home Computing Centers, told Woods that so far the market crash hadn't put a dent in his business. His customers didn't even mention it, likely because most of them didn't have significant money tied up in the stock market to begin with. Indeed, Williams said November was a strong month for sales so far and that business had almost doubled within the past three days. So people were out at the stores and ready to buy.

Woods said that Christmas buying had a big impact on both sales volume and on the kinds of products that sold. Computer games, for example, represented about 75 percent of sales at this particular Home Computing Center store. But the popularity of entertainment software didn't mean that Yuletide shoppers were less sophisticated. They seemed to be getting more selective. Williams added that many customers were now buying a second machine and trading up–or trading in–older machines.

Computer Gifts for the Business Traveler (Without a Secretary)

Back in the studio, Wendy Woods and George Morrow joined Cheifet and Kildall for the annual holiday round table. Morrow began by recommending *Byline*, a $300 desktop publishing package from Ashton-Tate, the company best known for the database program *dBASE III*. Morrow said he liked *Byline* because it allowed you to import files from other programs like *dBASE III* or a spreadsheet, format the data as you wanted, and publish a final document without altering the original files. Morrow felt this would become the standard for "civilized desktop publishing" in the future.

Morrow had two more recommendations for this round. The first was *LapLink*, a $100 software package that made it possible to transfer files between different PCs using an included serial cable. The software came on both 5.25-inch and 3.5-inch floppy disks. Finally, Morrow demonstrated *Higgins* on a portable computer. *Higgins* was a $200 organizer application published by Conetic Systems. Morrow showed how *Higgins* kept his appointment schedule, calendar, and telephone directory. It could even automatically dial someone directly from the directory. Morrow said it was the best piece of personal productivity software that he had seen. (He added that *Higgins* had taken the place of the secretary he could no longer afford.)

Moving on, Gary Kildall continued on his scanner kick by recommending the Complete Hand Scanner, a $249 portable device from Complete PC. Kildall said this device offered a low-cost way of getting images into a computer system. He demonstrated by scanning a *Far Side* cartoon by Gary Larson into an IBM PC. (Larson probably would not have been pleased by Gary's brazen copyright infringement.) Kildall said the included software could also be used to manipulate the image and add text.

Next, Cheifet's recommendations focused on mobile computing, something he that had a lot of experience with in these days as he regularly commuted from Pennsylvania to California to record *Computer Chronicles*. First, he showed the relatively low-cost Toshiba T-1000 laptop, which retailed for $800. (Morrow said that you could find them as cheap as $650 in *Computer Shopper*.) Cheifet said he liked the T-1000 because it was the smallest and lightest laptop he had ever used, weighing only about six pounds (2.72 kg). He noted there were limitations–the machine only had one disk drive, the LCD screen was not backlit, and the battery could not replaced–but it was a fully IBM-compatible computer that you could stick in your briefcase. Morrow asked about the battery life. Cheifet said it was about four hours, but if you added accessories like a modem or a RAM card that would eat up the battery quicker.

And speaking of conserving laptop battery power, Cheifet showed off his next recommendation–the Worldport 1200, a portable modem that ran off its own 9-volt battery and sold for between $150 and $200. Cheifet said the WorldPort worked with any computer and plugged right into his T-1000. He also showed a portable inkjet printer, the Diconix 150, which ran on rechargeable C-cell batteries and retailed for between $300 and $400. Morrow quipped that a year from now, you would see a similar portable product that would combine the functions of a printer, scaner, and fax machine.

Cheifet wrapped up by showing some smaller computer-related accessories for business travelers. The first was a $45 portable telephone jack that plugged into a hotel telephone receiver. This allowed you to connect a modem even if the hotel room's phone was hardwired to the wall. Finally, he showed a $19.95 vinyl sleeve that was used to store floppy disks.

Fears of a (Toy) Bot Planet

Continuing her robotic toy arc from the previous year's holiday buyers guide, Wendy Woods showed off Julie, a $100 talking doll from California-based toy company Worlds of Wonder. Woods noted the company marketed Julie as "the world's most sophisticated doll." Inside of Julie was a computer chip with 64KB of memory and a voice synthesizer. Julie was capable of speech recognition and could learn "secret" words. Woods attempted to have a conversation with Julie, which didn't go so well. (Woods quipped Julie didn't listen to her like most children.)

Julie also came with a built-in motion detector, Woods said. This meant Julie recognized when she was being moved and could vocalize that fact to a child. There was also a temperature sensor, so if you were to say put Julie in the freezer–which Woods said she did momentarily–she would tell you she was getting cold. Similarly, there was a light detector so Julie could know and say if it was getting dark. There was also an included picture book with various pads. Placing Julie's hand on a pad would cause her to say the name of the adjacent item pictured.

After the break, the group returned for a final round of gift recommendations. Woods continued on theme and presented Mr. Gameshow, a $100 talking robot toy from Galoob. Mr. Gameshow was a 14-inch plastic figure of a white male game show host standing behind a podium on top of a computer base. Woods explained that Mr. Gameshow had speech synthesis and a 700-phrase vocabulary. The toy was designed to play four different games. Depending on the game, you used a letter touchpad on the base of the unit. The talking host would then give insults or compliments to the player depending on whether they did well in a game or not. The product also came with play money and an audio cassette with additional games.

Cheifet asked about the age level for Mr. Gameshow. Woods said she had a teenage babysitter who couldn't stand the thing, but her father loved it. Morrow said that he found Mr. Gameshow rather interesting despite the fact he didn't care for actual television game shows. Cheifet observed it was basically a computer game without the computer. Woods said that it was more a demonstration of what modern electronics was doing for the toy industry.

Animation and Artificial Intelligence

Moving back to Kildall, he recommended *VideoWorks II*, a $200 software package for the Macintosh published by MacroMind that was used to make animated presentations. He said it was based on the same principles as old-style animation where you laid out scenes by arranging keyframes. He showed a demonstration running on a Macintosh II depicting a group of race cars at a track. Cheifet noted that while this demo was silent and in black-and-white, *VideoWorks II* was capable of producing animations with sound and color.

Cheifet then showed off some inexpensive novelty software packages. The first was *Ask God*, a $50 program that claimed to use "artificial intelligence" to help you study the Bible. Basically, you could enter a natural-language query about a particular subject in the Bible, such as, "I want to know the meaning of the abundant life." The program would then pull every phrase from the Bible that talked about the abundant life. (Morrow jokingly asked if any churches had actually blessed the software.)

The next item Cheifet displayed was *Daily Features*, a $15 program that provided quotations, vocabulary words, and trivia questions when you turned on the computer each day. He said it would make a good gift for a secretary who used a computer. Cheifet also showed a $6.95 program called "Fortune Cookies" that performed a similar function by providing daily fortune cookie slogans.

Finally, Kildall demonstrated *Business Class* for the Macintosh II. This was a $50 package from Activision–now known as Mediagenic–designed to help business travelers identify customs in various foreign countries. For example, if you clicked on London, it would bring up a screen detailing the currency exchange rate, a list of major airlines serving the city, local hospitals, and so forth. Morrow noted that *Business Class* required Apple's *HyperCard* to run.

Paul's Picks for the '87 Holidays

While he didn't appear with the main panel this year, Paul Schindler used his customary software review segment during "Random Access" to recommend several holiday gifts of his own. The first was a $10 program called *'Twas the Night Before Christmas* published by Simon & Schuster. This included an animated musical Christmas card that played "Jingle Bells," provided a re-telling of the eponymous story, offered a simple Christmas-themed puzzle game, and allowed children to write and print out letters to Santa.

Next, Schindler recommended an update to an item Stewart Cheifet discussed in a previous buyers' guide show, Broderbund's *Science Toolkit*. Schindler talked about a $40 add-on for *Toolkit* called *Body Module*." He said it was well-written software that was both fun and educational. Specifically, *Body Module* let you measure things such as your heart rate and the volume of air in your lungs.

Moving on to more expensive offerings, Schindler said that at the "outer limits of reasonable pricing" was *Microsoft Bookshelf*, a $300 CD-ROM compilation of reference books. He also recommended two luxury hardware items. The first was a $500 fax card from The Complete PC. The other was a $1,495 Dest scanner that could digitize any document and store it in on a computer.

Byline Proved to Be Short Lived

Let’s start with one of George Morrow’s recommendations, *Byline*. Ken Skier authored *Byline* through his Massachusetts-based company, Skisoft, Inc. Skier began his career as a writer. As an undergraduate at MIT in the 1970s he founded a creative writing program at the school and later served as a senior lecturer. Following a three-year stint at Wang Laboratories, Skier founded Skisoft in 1982 and authored a series of early computer programming books, including *Beyond Games: Systems Software for Your 6502 Personal Computer*.

Skisoft’s early software products focused primarily on word processing. In 1986, Skier demonstrated an early prototype of what became *Byline* to select reporters at COMDEX. A year later, Ashton-Tate released the finished program at an initial retail price of $395.

To be clear, *Byline* was never meant to compete with top-shelf desktop publishing packages like *PageMaker* or *Ventura Publisher*. Rather, Skier’s software offered a relatively inexpensive way to take documents designed in popular business applications like *WordPerfect* or *Lotus 1-2-3* and apply some additional formatting. *Byline* did not have a graphical interface, and it probably wasn’t seen by most consumers as the “civilized” desktop publishing alternative that George Morrow made it out to be.

In fact, *Byline* had a relatively short life cycle. Although *PC World* said *Byline* had a “fairly successful” launch, plans to release an updated version never materialized. Ashton-Tate had announced *Byline 2.0* at the fall 1988 COMDEX show in Las Vegas with a promised ship date of June 1989. But in November 1989, the company canceled the project. One Ashton-Tate executive told Wendy Woods’ *NewsBytes* that there were “insurmountable problems” with the release, notably difficulties with writing multiple different printer drivers. Additionally, Ashton-Tate CEO Ed Esber, Jr., told *InfoWorld* the cancellation was due to August layoffs at the company that had “swept aside many small projects.”

Worlds of Wonder's Not So Wonderful Bankruptcy

I feel like the big takeaway from this episode involves a computer-related product that was not mentioned at all on the program–the Nintendo Entertainment System (NES). Although Nintendo of America first launched the North American version of the Nintendo Family Computer through a New York City-only test market in late 1985 before going national in 1986, it was 1987 that saw the NES start to reach the height of its popularity. The industry publication *Toy & Hobby World* reported in November 1987 that the NES was the top-selling toy that year in terms of the number of units sold.

And yet the *Computer Chronicles* gang seem too enamored with computer-driven robot toys like Worlds of Wonder's Julie and Galoob's Mr. Gameshow to notice the NES. In retrospect, this was funny for a couple of reasons. First, neither of the toys ended up holding a candle to the NES, which sold about 4 million units in 1987 alone. And second, both Worlds of Wonder and Galoob ended up playing supporting roles in the success of the NES, although neither company survived in the long term.

Let's start with Worlds of Wonder. Donald Kingsborough, a former sales executive with the original Atari, Inc., founded Worlds of Wonder (WOW) in February 1985 to market technology-driven toys. WOW saw its first big hit during the 1985 holiday season with Teddy Ruxpin, an animatronic teddy bear created by former Walt Disney designer Earl Forsse that was able to "talk" thanks to a built-in cassette player. Frosse's company, Alchemy II, licensed Teddy Ruxpin to Worlds of Wonder, which sold 41,000 units of the $79 bear in September 1985, its first month on the market. During that first holiday season, WOW shipped an additional 75,000 units. By the end of 1986, that figure had ballooned to 1.5 million.

Kingsborough wasted no time cashing in on his hit toy. Worlds of Wonder went public less than a year after the Teddy Ruxpin launch. The stock opened at $18 per share at its initial offering on June 20, 1986–raising nearly $112 million in capital–and ended the day at $29, marking the biggest debut for a technology stock in nearly six years. Kingsborough personally made at least $7 million that day by selling some of his own stock while still retaining about 20 percent of the company, according to Knight-Ridder. Of course, WOW's first-day success would prove to be yet another case of irrational exuberance on the part of the stock market. Kingsborough's company would never see a trading day to match that opening–at least not a positive one–and within 18 months, WOW would crash and burn in spectacular fashion.

To be fair, WOW was not a one-hit wonder (forgive the pun). Kingsborough followed up Teddy Ruxpin with the infrared toy gun game Lazer Tag in 1986, which also proved to be a substantial hit. It was also in 1986 that Kingsborough returned to his roots in the video game industry by agreeing to serve as the North American retail distributor for the Nintendo Entertainment System. As video game historian Alexander Smith recently explained to me in a conversation on Discord, Kingsborough and his top sales executives, Mark Bradlee and Jim Whims, essentially "taught Nintendo everything they needed to know about retail" in the U.S. market. In effect, Kingsborough and WOW leveraged the popularity of Teddy Ruxpin and Lazer Tag to coax retailers still smarting from the 1982-83 collapse of the Atari-led home video game market into carrying the Nintendo Entertainment System in their stores. And that strategy ended up paying off big-time for both the retailers and Nintendo.

Unfortunately, it didn't do much for Worlds of Wonder. A couple of weeks after Wendy Woods gushed about WOW's latest talking doll offering, Julie, the company filed for Chapter 11 bankruptcy protection. What went wrong? Well the first culprit was Julie herself. Kingsborough thought his talking doll would produce a third consecutive Christmas hit for WOW. After all, this new doll was far more technologically advanced than Teddy Ruxpin. But while it impressed the tech-savvy *Computer Chronicles* panel, it didn't impress parents faced with a sticker price as high as $125 in some stores. You could have bought 10 "analog" Barbie dolls from Mattel for that same price. For that mater, you could have bought an NES, as the price of the base system had come down to around $80 by the 1987 holiday season.

WOW's next problem was distribution. Denise Gellene, writing for the *Los Angeles Times* in December 1987, reported that WOW struggled to keep up with retailer demand. Its talking doll release for the 1986 holiday season, Pamela, was delivered late to toy stores. And even many shipments of Lazer Tag failed to arrive until that Christmas that year. The same delivery woes plagued Julie, which arrived too late for many retailers to effectively move the expensive dolls.

At the same time, Teddy Ruxpin's success had inspired a lot of other companies to jump on board the talking-doll bandwagon. There was Axlon's A.G. Bear, which Wendy Woods demonstrated in the first *Computer Chronicles* holiday episode back in 1985. (Axlon, of course, was owned by another Atari veteran, company co-founder Nolan Bushnell.) The more established toy companies like Mattel and Coleco also had their own talking dolls in stores for the 1987 holiday season. And according to the Times' Gellene, none of them sold especially well, largely because parents thought they were all too expensive.

And even when WOW managed to ship and sell its products, its costs were high, in large part because Kingsborough had to spend millions of dollars promoting the toys. WOW reported a $130 million net loss in 1987. More problematic, the company carried around $300 million in debts, including $80 million from bond offering made in June 1987 to bring in much needed short-term cash. On top of that, WOW had around $130 million in unsold inventory when it filed for Chapter 11. The company's creditors promptly forced Kingsborough to try and stem the bleeding by cutting prices drastically on the unsold inventory and laying off half of the company's staff.

WOW limped along in bankruptcy court throughout 1988 and early 1989. In April 1988, the creditors forced Kingsborough out as CEO and replaced him with a management consultant, Stephen J. Hopkins. Hopkins brought in a former Mattel executive, Loewn Hldebrand, to try and clean up Kingsborough's mess. Hilderbrand decided to move away from the $100-plus electronic toys and take the company back to "toy basics", as it were. For the 1988 holiday season, WOW's most notable new item was Germs, a collection of 12 different rubber toy germs that sold for around $3 each. (This followed yet another industry fad, so-called gross-out toys.)

Still in bankruptcy heading into 1989, WOW finally found a trio of buyers: Franklyn S. Barry, Jr., David Edelman, and Eli Jacobs. Barry was the former president of the Illinois-based toy company Fisher-Price. Edelman, a Buffalo-based businessman, came from the computer industry. Jacobs, a financier who had quietly built a business empire through leveraged buyouts and junk bonds, had also purchased a controlling interest in the Baltimore Orioles baseball team that same year.

The new ownership group named Joshua Denham as WOW's CEO. Denham had previously served as president of Mattel Electronics before that business collapsed during the previously mentioned 1982-83 video game crash. Denham remained in direct control of WoW until December 1990, when he assumed an executive position with the parent company that Edelman and Barry had established to oversee their various businesses, including another toy company they had purchased, New York-based Lewco Corporation. Keith E. Schaefer, a vice president with NEC Technologies, was then tapped as WOW's final CEO.

Schaefer's tenure proved to be as brief and unsuccessful as those of his predecessors. In September 1991, Rhode Island-based toy giant Hasbro snatched the Teddy Ruxpin rights away from WOW after six years. A spokesperson for the rights owner, Alchemy II, told the press that WOW no longer had the resources to market the still-popular talking bear. A few weeks later, Barry and Edelman confirmed that they reached a deal to sell their stake in WOW to Jacobs. Edelman told the *Buffalo News* that they had pinned their hopes for a WOW rebound on the 1990 holiday season, which "turned into the worst toy season that the toy industry has had in the last 10 to 15 years."

Meanwhile, Eli Jacobs' financial empire was starting to crumble under the weight of too many junk bonds and leveraged buyouts. In 1993, Jacobs' creditors forced him into bankruptcy and he ended up selling the Orioles at a bankruptcy auction to attorney

Peter Angelos. It would seem that WOW got lost in the shuffle of this collapse. A local newspaper in Fremont, California, where WOW was based, reported that the company closed its doors for good sometime in October 1991, not long after losing the Teddy Ruxpin license.

Mr. Gameshow Didn't Quite Sink Galoob–and Neither Did Nintendo

On August 4, 1971, San Francisco businessman Lewis Galoob died at the age of 52. In 1954, Galoob and his wife Barbara founded Lewis Galoob Toys, a small importer of toys and stationary items. The Galoobs formally incorporated the business in November 1968. In its early days, Lewis Galoob Toys' most notable success came from distributing a Japanese toy called the Jolly Chimp, i.e., the cymbal-banging monkey.

Following Lewis Galoob's death, his 21-year-old son David Galoob dropped out of film school to assume control of the business. The younger Galoob struggled to keep the company afloat while transitioning it from a toy importer to a toy manufacturer. Lewis Galoob Toys started to see some measure of success in the late 1970s after releasing a line of radio-controlled cars and trucks. The company took its next step forward in the early 1980s when it produced a successful line of action figures and accessories based on the NBC television program *The A-Team,* which notably featured breakout star Laurence "Mr. T" Tureaud.

Encouraged by the popularity of its Mr. T action figures, Galoob made a modest initial public offering in September 1984, which raised $12.5 million. But once the Mr. T fad inevitably passed, Galoob struggled to come up with its next big hit. The company decided to enter the talking-doll boom in 1986 with Baby Talk, which sold reasonably well. But then David Galoob decided to double-down on the electronic toy fad by making Mr. Gameshow the focus of the company's 1987 holiday season. That would prove to be a major mistake.

Mr. Gameshow was the brainchild of Jeffrey Breslow, Howard Morrison, and Rouben Terzian, a trio of legendary toy designers then with the Chicago firm of Marvin Glass & Associates. (The three would leave Marvin Glass in 1988 to start their own firm, which is still in business today under the name Big Monster Toys.) David Galoob told the Associated Press' Joyce Rosenberg that when the Marvin Glass team showed him the Mr. Gameshow prototype, it took him "about three seconds" to decide Galoob had to produce it.

Galoob started rolling out Mr. Gameshow to the press at the February 1987 American International Toy Fair in New York City. The reaction was mixed. Henry Schulman of the *Oakland Tribune* said the plastic game show host–named "Gus Glitz" by Galoob marketing–may have come with a 700-word vocabulary, but that was "about 699 too many." And while Galoob claimed Mr. Gameshow was the "hottest new product among buyers" at Toy Fair, one buyer from Texas told Schulman that he was still unsure about carrying a $100 toy.

But overall, the press and industry analyst reviews of Mr. Gameshow were largely positive heading into the 1987 holiday season. Mr. Gameshow was essentially a talking doll combined with a series of simple "Wheel of Fortune"-style games, combining the latest fad with a more traditional category. Yet like Worlds of Wonder's Julie, Mr. Gameshow sold at a premium price during a holiday season dominated by the NES and the return of video games, which the press and analyst community continued to largely treat as a dead market.

Put simply, Mr. Gameshow was a disaster for Galoob. After the holiday season came and went, retailers slashed the price from $100 to as low as $30. Galoob reported a $25 million loss for the year and had to negotiate two new lines of credit with its bank just to stay afloat. David Galoob realized he'd made a mistake betting the company on expensive electronic toys, so he decided to refocus on a less-expsneive category that had been successful for Galoob in the past: cars.

More specifically, very small and inexpensive cars. It turned out that another product David Galoob had licensed just before the

1987 holiday season was Micro Machines, a line of collectible toy cars that were notably smaller than the average toy vehicles of the time. Clemens V. Hedeen Jr., a Wisconsin attorney and toy store owner, came up with the idea for Micro Machines. Hedeen recalled to the *Green Bay Press Gazette* in 2018 that he was talking to a Galoob representative about developing a "new, reasonably priced car line" at a trade show. Hedeen then worked with a designer at his store to produce 24 prototype cars, which he sent to Galoob. "They loved it and wanted to go into contract immediately," Hedeen said.

This time, David Galoob's impulsiveness proved correct. The low-priced mini-vehicles were a hit with parents and kids. By 1989, Galoob reported a $20 million profit on $140 million in sales. And 75 percent of those sales came from Micro Machines.

In 1990, Galoob diversified its offerings to include a unique video game product known as the Game Genie. The Game Genie was not a game cartridge. Rather, it was an accessory for the NES that attached to a game cartridge and allowed the player to temporarily alter aspects of the game using various codes. For example, a player could use a code to gain unlimited lives in *Super Mario Bros.* The Game Genie even came with a booklet featuring codes for most popular NES games of the time.

A British company, Codemasters Software Co., Ltd., originally developed the Game Genie and licensed it to a Canadian firm, Camerica, Ltd., which subsequently sub-licensed the U.S. distribution rights to Galoob. One company that was not involved in this arrangement was Nintendo. Galoob had sought a license from Nintendo to release the Game Genie as an "official" NES accessory, but Nintendo declined.

Well, Nintendo did more than decline. Nintendo of America officials declared legal war against the Game Genie, which it saw as a means of creating "derivative works" that violated the copyrights of Nintendo-licensed games. Howard Lincoln, Nintendo of America's senior vice president and general counsel, told the press that the Game Genie represented an existential threat to home video games: "We cannot stand by while the essence of our business, the creation of ever more challenging video games, is put at risk by the Game Genie product."

Galoob technically fired the proverbial first shot, filing a lawsuit in a California federal district court seeking a declaration that the Game Genie did not violate any of Nintendo's NES copyrights. Nintendo of America followed up a few weeks later, filing a counter-claim that in fact the Game Genie did violate its copyrights and trademarks.

Although Nintendo won a preliminary injunction against to temporarily halt sales of the Game Genie, Galoob ultimately prevailed following a bench trial before U.S. District Judge Fern M. Smith. In July 1991, Smith issued a judgment holding that when consumers bought and used a Game Genie to temporarily modify their NES games, they did not create a "derivative work" under copyright law. Thus, Galoob was not contributing to any copyright infringement. And even if it did, consumers still had a right under "fair use" to use the Game Genie for their own enjoyment. Nintendo appealed Smith's ruling, but she was upheld by the U.S. Ninth Circuit Court of Appeals in a 1992 opinion.

Even with the success of Micro Machines and the Game Genie, however, Galoob remained a small player in the larger toy market. For comparison's sake, while Galoob reported sales of roughly $240 million in 1997–making it the number-three toy company in the United States–the number-two company, Hasbro, had $3.18 billion in sales. And Galoob was struggling to keep up. In October 1997, Hasbro and Galoob won the licensing rights from Lucasfilm, Ltd., to produce toys for the upcoming "Star Wars" prequels. (Hasbro would make the big toys, while Galoob would make the smaller toys.) But Galoob had to offer Lucasfilm 20 percent of the company's stock–at $15 a share–just to get that deal done. Ultimately, it proved to be a moot point, as Hasbro bought Lewis Galoob Toys in September 1998 for $220 million in cash, giving Hasbro complete control of the "Star Wars" toy license, which it continues to hold to this day.

Notes from the Random Access File

- This episode is available at the Internet Archive and originally aired during the week of December 2, 1987. The studio portions were recorded on November 21, 1987.
- Home Computing Centers was a chain of at least four retail stores in northern California. Daniel Williams founded the company in March 1983. As best I can tell, the business shut down sometime around 1989 or 1990.
- *LapLink*, the software mentioned by George Morrow, is still around–or at least the company Laplink still exists. Today, Laplink Software, Inc, produces a variety of products under its “PCmover” brand.
- *Ask God* was designed by Marc Woodward of Integrated Systems in Kirkland, Washington.
- Danny Goodman authored *Business Class* for Mediagenic/Activision. He appeared in an earlier *Chronicles* episode from this season to demonstrate the other program he wrote for Mediagenic, *Focal Point*.

Chapter 8: Macintosh Business Software

Apple CEO John Sculley's quest to extend the Macintosh's reach in the business market took an important step in November 1987 with the launch of *MultiFinder*, an extension to the System Software 5 operating system that finally enabled a form of multitasking on the Mac. This gave Apple a jump on IBM's long-promised multitasking OS/2 by a few weeks. And while the Mac never posed a serious challenge to the IBM PC and its clone army in the overall business market, the combination of *MultiFinder* with more expandable machines like the Macintosh II helped to cement Apple's place as the primary alternative microcomputer platform for many business users.

This next *Computer Chronicles* episode from early December 1987 focused on Mac business software, including *MultiFinder*. Stewart Cheifet opened the program by noting that the Macintosh had snuck into the business world through desktop publishing applications like *Ready, Set, Go!*, which he demonstrated on a Macintosh SE in the studio. But all of a sudden, people were starting to take the Mac seriously for a variety of business applications. Why the sudden change? Kildall said that when the original Macintosh was introduced in 1984, the machine had two major deficiencies. The first was that it only came with a floppy drive and no hard disk option. The second was a lack of memory (128KB on the original machine). So as a result, you really couldn't run business applications on the Mac. Those deficiencies had now been addressed–you could buy a Mac with a hard disk and up to 2MB of main memory. So the Mac was now a serious business competitor.

San Francisco Lawyers Built Practice Around Mac

Wendy Woods presented her first remote segment, narrating some B-roll footage of Williams & Martinet, a San Francisco law firm that used the Macintosh to run its business. Woods said the Macintosh, still working hard to make its mark in the office, was beginning to get some serious attention from business users. At Williams & Martinet, for example, the Mac handled everything from basic accounting to court documents.

Roger P. Williams, a computer consultant with the firm, told Woods that the original reason for using the Mac was it had graphics capabilities that IBM PCs did not. The IBM could handle word processing. But the Mac made it possible to put legal forms, including court pleadings and the firm's letterhead, directly into the computer.

Woods said that a software package called *Trapeze* provided the building blocks for many applications at the firm, including spreadsheets, client history, and billing. *Trapeze* also tracked the amount of time each attorney spent per client, as well as each employee's productivity. (*Trapeze* and its creator, Andrew Wulf, were previously featured in an April 1987 *Chronicles* episode.)

The practice of law was beset with forms, Woods noted, each of which had to be duplicated precisely before it could be accepted by the courts. In the past, this meant relying on unreliable photocopies filled in by typewriter. But now, Williams & Martinet used a scanner and a program called *TrueForm* to enter and store the originals. Copies could then be filled-in on the computer and produced on a laser printer.

Woods added that in another departure from physical work, Williams & Martinet attorneys who were working out-of-town could receive forms via modem. Leonard Martinet, one of the firm's partners, explained that the original documents were typically sent from the San Francisco office to a remote copy center equipped with a laser printer, which then printed out the faxed document for the local attorney.

Overall, Woods said that the Macintosh had opened up new areas of business for Williams & Martinet, such as direct-mail advertising. And for preparing common legal documents like wills, staff could take client information over the phone and enter the data into a program called *Legalware*, which produced a draft of the final will. Leonard Martinet added that his firm was lucky in that they didn't have any IBM computers previously, so when a "refreshing idea" like the Macintosh presented itself as a viable alternative, they were able to adopt it.

WriteNow Developer Promised High-Performance Word Processing

Heidi Roizen joined Cheifet and Kildall in the studio. Roizen was co-founder and president of the T/Maker Company, which published the Macintosh word processing program *WriteNow*. Kildall opened by noting that desktop publishing and word processing had started to merge. How did you continue to differentiate the two products? Roizen said one difference was the role that graphics played in the document you wanted to create. In the case of a word processor like *WriteNow*, graphics were still an accessory to the words. *WriteNow* focused on handling large amounts of text formatting, such as columns and fonts, rather than drawing graphics.

Cheifet asked for a demonstration of *WriteNow* running on a Macintosh II. Roizen described the software as a "performance word processor" that included a number of features missing in the original Macintosh word processors. For example, she pulled up a one-column document and then selected a menu item to convert it into a two-column document. Cheifet noted this was a case of adapting WYSYWIG features from desktop publishing packages. Roizen agreed. She then showed off how you could select multiple sections of text–and their accompanying section headers–and change only the font used in the headers. Next, Roizen showed *WriteNow*'s enhanced "undo" function, which could undo virtually any last moved made by the user. She undid the font change she just made by selecting the "Undo Style Change" option from the program menu.

Kildall asked to see some examples of graphics in *WriteNow*. Roizen explained that the software supported both vector and bitmap graphics. To demonstrate, she inserted a bitmap image of a pair of scissors next to a section header in her sample document. Kildall clarified that this image was a *MacPaint* drawing. Roizen then showed that you could enlarge the image and otherwise treat it like a text element, such as by cutting-and-pasting it elsewhere in the document.

Roizen also showed how *WriteNow* could automatically re-size an image by double-clicking on it. This was useful when changing the number of columns in a document. She pulled up another sample file containing a two-column document with an image that was now too wide. By double-clicking on the image, its size reduced to fit within a single column.

Kildall asked about features like hyphenation and spell checking. Did those come standard? Roizen said yes, *WriteNow* had a built-in 50,000-word spelling checker and selective hyphenation. Cheifet mentioned there was also a footnote feature, which Roizen then demonstrated. She added that you also never had to re-paginate with *WriteNow*, as the program handled that automatically.

VideoWorks Animated Mac Presentations

Wendy Woods returned for her second remote segment, which discussed *VideoWorks II*, a Macintosh animation package developed and published by MacroMind, Inc . Woods' report focused on the use of *VideoWorks II* by a Palo Alto, California-based company called Animatronix.

Specifically, Woods said that Animatrix used *VideoWorks II* to create animations for sales, marketing, and training presentations. Marney Morris, Animatrix's founder and president, told Woods that animation could be an effective business tool. She said animation was much like writing. A good writer could write something beautiful, and if you didn't take the time to keep your user as the focal point, you wouldn't get your point across. Woods then narrated some footage of a sample *VideoWorks II* animation, a jungle-themed training disk designed in conjunction with *HyperCard* to help new hires at Apple Computer navigate through the "jungle" of people, places, and phone numbers on the job.

But why would a company come to Animatrix for these kind of animations rather than just buy *VideoWorks II* and do it themselves, Woods asked rhetorically. Because you couldn't just buy the skill and hard work that it took to make a good presentation. And while computer companies were among the first to capitalize on this new technology, it was only a matter of time before the rest of coprorate America learned the value of these tools as well.

Taking Databases Into the 4th Dimension

Dave Dell'Aquila joined Cheifet, Kildall, and the returning Heidi Roizen for the next segment. Dell'Aquila was a technical support engineer with ACI US Corporation, which developed the Macintosh database application *4th Dimension*. Kildall opened by noting that ACI US claimed its product had an "open software architecture" that could be used to build "custom environments." What did that mean? Dell'Aquila said *4th Dimension* had the ability to use external procedures written in other environments as if they were written in *4th Dimension*'s own scripting language. *4th Dimension* itself came with about 200 pre-programmed routines that could be used to build simple database applications.

Kildall asked for a demonstration of *4th Dimension* running on a Macintosh II. Dell'Aquila pulled up a screen showing the program's "design environment," which was one of three environments available. The design environment was where the user created the structure, layouts, and procedures for a database. He opened a new project and proceeded to create a sample table for a product database. Among the features he noted was the ability to create a multiple-choice list of items for a specific field. Dell'Aquila added that you could have up to 99 "files"–which I think meant tables in this context–for a given database. He then showed how you could link one table to another table to create a relational database.

Continuing the demo, Dell'Aquila created a layout for his products table. *4th Dimension* came with several default layouts. He selected one and created the layout (i.e., form), which also generated the necessary code to link together the two tables. You could then edit the finished layout.

With his new layout completed, Dell'Aquila entered a sample record. He then demonstrated how you could use the layout to search for an item, using wildcards if you didn't know the complete term. He then created a graph–*4th Dimension* had eight default types–to display information taken from the database.

Kildall asked about creating a custom environment. Dell'Aquila said *4th Dimension* could create a standalone database application. The user could define their own menus, dialog boxes, and other user interface elements.

MuliFinder Expanded the Capabilities of the Mac OS

For the final segment, Charlie Oppenheimer and Robert Wiggins joined Cheifet and Kildall in the studio. Oppenheimer was the Macintosh group product manager at Apple. Wiggins was a contributing business editor with *MacUser* magazine (and publisher of the new *Macintosh Business Letter*).

Kildall asked Wiggins what multi-tasking systems like *MultiFinder* would mean for the business user. Wiggins said it represented an opportunity for more productivity. Business users were currently "going nuts" for both multi-user systems and multi-tasking systems. They wanted each user to be able to do more things, and they wanted everybody to be able to share the same thing. But this was also the leading edge of technology, which meant it was dangerous. And business users wanted stability. This posed an issue when using something like *MultiFinder*, as some applications didn't work with it, so business users ran the risk of losing data.

Chiefet then pivoted to Oppenheimer and asked him to demonstrate *MultiFinder*. Oppenheimer described *MultiFinder* as a "first-generation multi-tasking operating system for the Macintosh." Basically, it added new functionality to the Macintosh system software while maintaining compatibility with a "large number of applications" and also worked across the entire Macintosh line of machines.

Specifically, Oppenheimer said *MultiFinder* provided three new capabilities. The first was the ability to view different applications at the same time and switch between them. The second was the ability to print a document to a LaserWriter printer as a background process. And the third was providing a foundation for third-party developers to create new applications that could run in the background.

Demonstrating this on a Macintosh II, Oppenheimer showed there were three applications open on the screen: *Microsoft Words*, the terminal emulation program *VersaTerrm-PRO* connected to a remote UNIX machine, and an MS-DOS emulator. Oppenheimer started a download in the remote terminal and kept that running in the background while he returned to his *Word* document. He then clicked back to the MS-DOS window and launched *Lotus 1-2-3*. Oppenheimer pulled a *1-2-3* file, copied data from it, and pasted it into the *Word* document.

Kildall noted that his company, Digital Research, started working with multi-tasking operating systems back in 1982, and when they first came out there were a lot of problems with incompatible applications. Specifically, there were issues at the file-system level that often crashed the system and destroyed files. How did *MultiFinder* avoid these problems? Oppenheimer reiterated this was a "first-generation" multitasking system. There were very strict guidelines that developers had to follow. (Kildall said he tried the same thing and it didn't work.)

Cheifet asked Wiggins for his advice to a business user that was looking at the Mac world and something like *MultiFinder*. How safe was it? Wiggins said that most business software should be well-written enough to avoid problems. It was things like games that were more likely to not run well under *MultiFinder*.

However, you never knew when a particular combination of programs running together would cause a crash. So it was important to save your work and back up data on a regular basis. Kildall added it was important to have a file-locking mechanism so that applications could share data safely. Without such protections, some applications could start trashing their own files. Wiggins quipped that *MultiFinder 2.0* would probably be a lot safer in that regard.

On that note, Cheifet asked Oppenheimer about the next generation of *MultiFinder*. Oppenheimer said Apple wasn't in the habit of discussing its plans in public. But people who were familiar with other multi-tasking operating systems would have a good idea of what functionality Apple was likely to add to *MultiFinder* in the future.

VideoWorks + Venture Capital = Flash?

This was the second consecutive episode to discuss *VideoWorks II*. In the previous holiday buyers guide show, Gary Kildall recommended and demonstrated the $200 program. The company behind *VideoWorks II* was Chicago-based MacroMind Inc. And if that name sounds vaguely familiar, it's because the company would later morph into one of the biggest (and most reviled) names in early web animation.

The concept for what became *VideoWorks* actually originated at another company, Dave Nutting Associates. Nutting was a developer of coin-operated video games acquired by Bally/Midway. Three of Nutting's designers–Marc Canter, Jamie Fenton, and Mark Pierce–realized that many of the tools they used to create sounds and animations for arcade games might be a viable product in its own right.

The trio left Nutting to form MacroMind, Inc., in 1984. Their original plan was to develop a single package for the then-brand new Macintosh that could both compose music and create animation. But as Marc Canter explained to the *Chicago Tribune* in October 1985, the sound limitations of the original Mac and pressure from their original publisher, Hayden Software, led MacroMind to separate the project into two programs: *MusicWorks* and *VideoWorks*.

Both programs proved successful, at least in terms of early Mac software. *MusicWorks* came out first, in November 1984, and sold 25,000 copies in its first eight months. *VideoWorks* released the following year, in May 1985, and sold 10,000 copies in its first two months.

VideoWorks II, released in 1987, helped cement MacroMind's software as an early industry standard for businesses looking to develop animations on the Mac platform. MacroMind took over publishing responsibilities for the sequel, although Broderbund served as the distributor. The program received top marks from reviewers and quickly developed a following within a number of major movie studios, including Walt Disney and Lucasfilm.

By early 1988, MacroMind had expanded from its original founders to a team of 22 employees. Marc Canter, who served as the company's president, told the *Tribune* in March 1988 that he was happy to keep the small company based in Chicago, despite the fact most of their customers were on the west coast. "On a personal level, Chicago is where I'm from," Canter said, adding, "On a professional level, Chicago is one of the reasons we've survived as a company."

That was all well and good–until the venture capitalists arrived. A few months after Canter gave that interview, the *San Francisco Examiner* reported that the Cole Gilburne Fund, a venture capital group that included a prominent Hollywood intellectual property lawyer, had "dumped a few million bucks" into MacroMind. And by the end of the year, in December 1988, Canter and his new investors decided that MacroMind really should be closer to Silicon Valley.

On December 12, 1988, MacroMind announced that Canter would step down as president. His successor was an outsider, John Scull, who had overseen desktop publishing and multimedia marketing for Apple. Canter remained as head of software development. But he and the rest of the company would move from Chicago to San Francisco in order to "get close to creative talent and the entertainment industry," according to a corporate statement.

One of Scull's first moves was to rename MacroMind's flagship product and jack up the price. The $195 *VideoWorks II* was now the $695 *MacroMind Director*. Wendy Woods reported in February 1988 that this was part of Scull's plans to build a "big company" based on multimedia products. Scull brought in a new management team and acquired another $2.4 million in venture capital, primarily from Kleiner Perkins.

Scull actually didn't stick around long. After overseeing the MacroMind's transition from small Chicago startup to heavily-funded Silicon Valley multimedia pioneer, Scull resigned from the company in November 1990, reportedly under pressure from Kleiner Perkins' John Doerr, a former *Chronicles* guest. Doerr then recruited Tim Mott, one of the original employees at Electronic Arts, as the new CEO of MacroMind.

Well, it wouldn't stay MacroMind for long. As required by the venture capital handbook, Mott promptly went on a merger spree. After acquiring another $5 million in venture capital, in July 1991 Mott announced that MacroMind would merge with another San Francisco-based multimedia company, ParaComp, which produced 3D modeling software for the Macintosh. Mott continued to serve as CEO of the combined company, which was cleverly named MacroMind-Paracomop. And less than a year after that, in March 1992, Mott decided to combine MacroMind-Paracomp with Authorware, a Redwood City, California-based company that created software for interactive kiosks.

This new company was renamed Macromedia, Inc. Mott staed on as chairman with Authorware's John C. "Bud" Colligan taking over as CEO. The duo then took MacroMedia public the following year so all those venture capitalists could finally get paid. Robert Burgess took over as CEO from Coligan in 1996 and ran the company until its acquisition in 2005 by Adobe Systems.

Throughout this history, the product line that started out as

VideoWorks remained in development. it was renamed *Macromedia Director* following the creation of Macromedia. And after the Adobe acquisition it became *Adobe Director*. Adobe finally discontinued *Director* in 2017.

Of course, if you remember Macromedia today, it is likely because of an early World Wide Web media player it acquired in 1996 called *FutureSplash*, which was then renamed *Macromedia Flash* and later *Adobe Flash*. And thus Steve Jobs' greatest enemy was born.

Roizen Navigated Choppy Waters of Post Apple-Jobs Split

Speaking of Jobs, he played a key role in another product demonstrated in this episode, *WriteNow*. In fact, while Heidi Roizen's T/Maker Corporation served as the publisher and distributor of the Macintosh word processor, the program was actually developed by Jobs' NeXT Computer, Inc., as it first software product. (Well, Jobs had acquired the original developer, Seattle-based Solaster Inc., in December 1985, but close enough.)

NeXT licensed the marketing rights to *WriteNow* to T/Maker Company in August 1986. The program started appearing on store shelves by that Christmas. As Roizen later told *MacWorld*, her company dealt with both Apple and NeXT and she was something of an intermediary between the two companies:

> I'm sort of a Hong Kong between China and Taiwan. Each side has to value the other, but they're not speaking. Politically we serve as a conduit–Steve couldn't have published *WriteNow* himself. What would he do–go to Macworld Expo and do demos in Apple's booth? I don't even know if Steve drives through Cupertino these days.
>
> I remember once talking to an Apple product manager who said that he hated seeing royalties

> on a great Mac product like *WriteNow* going into Steve's pocket. There's no way to answer comments like that.
>
> Nevertheless, a lot of respect remains between the two companies. The people who wrote *WriteNow* are at NeXT, yet they identify with Mac and and are proud of what they did for an Apple computer.

Even after getting into word processing, T/Maker Company's main focus was developing clip art and font packages for both the IBM PC and Macintosh platforms. *WriteNow* proved a modest success–selling about 40,000 copies in its first year on the market–but it was never better than the number-two word processing program for the Macintosh, lagging substantially behind *Microsoft Word*. Still, that was good enough for T/Maker to continue releasing updated versions of *WriteNow* until 1993, when Roizen sold the rights to the program to WordStar International, the one-time leader in the PC word processing market. Roizen said at the time that T/Maker divested itself of *WriteNow* in order to "aggressively pursue the rapidly growing electronic content market."

It turned out that meant "selling the company a year later." In June 1994, Deluxe Corporation–the company best known for printing bank checks–acquired T/Maker Company for an undisclosed amount. T/Maker was never a public company. Roizen and her brother, Peter Roizen, co-founded the company in 1983 to take over the sales and distribution of a program Peter had written called *Table Maker* (shortened to *T/Maker*).

Following the sale of T/Maker Corporation, Heidi Roizen remained as CEO of the now-Deluxe subsidiary for a time. In January 1996, she joined Apple as vice president of worldwide developer relations. It wasn't exactly the best time to join the company, which was dealing with a failed boardroom coup against CEO Michael Spindler and rumors of a possible sale to stave off bankruptcy.

Roizen only stayed with Apple a year. She resigned in February

1997. She told longtime *Chronicles* contributor Tim Bajarin that she “found the level of commitment necessary for me to do this job does not sell with well with” her commitment to her family, particularly her two young children. Of course, not long after Roizen’s departure, Steve Jobs returned to Apple after it acquired NeXT.

Since leaving Apple, Roizen has been an active venture capitalist with Threshold Ventures and served on a number of corporate boards. She is also an adjunct lecturer at Stanford University.

4D Still Chugging Along

Another product from this epispoide, the relational database manager *4th Dimension*, is still in active development under the direction of its original company. French programmer Laurent Ribardière started working on a Macintosh database as a 21-year old university student. In 1985, Apple contracted Ribardière to develop his program in-house, which he originally named *Silver Surfer*. But after existing database companies like Ashton-Tate threatened to cut off Mac development if Apple made a competing product, Cupertino cut Ribardière loose.

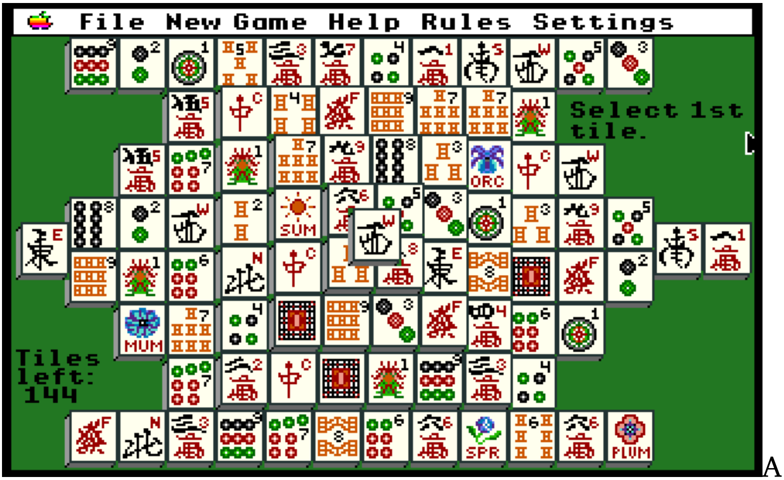
But he didn’t walk away empty handed. Two sympathetic Apple executives helped him set up his own company, ACI, with ACI US as its American subsidiary, so that Ribardière could publish the database himself. He renamed the finished product *4th Dimension*. The new database quickly gained a following as the first graphical relational database management system.

After more than a decade in production, Ribardière shortened the name of the product to *4D*. He then changed the name of ACI to 4D, Inc., in 2000. Today he remains the majority shareholder of the company, and the most recent feature release of *4D* was in April 2023.

Notes from the Random Access File

- This episode is available at the Internet Archive and was first broadcast during the week of December 9, 1987. The studio portions were recorded on November 21, 1987. The recording on the Archive is from a rerun that was broadcast during the week of May 27, 1988.

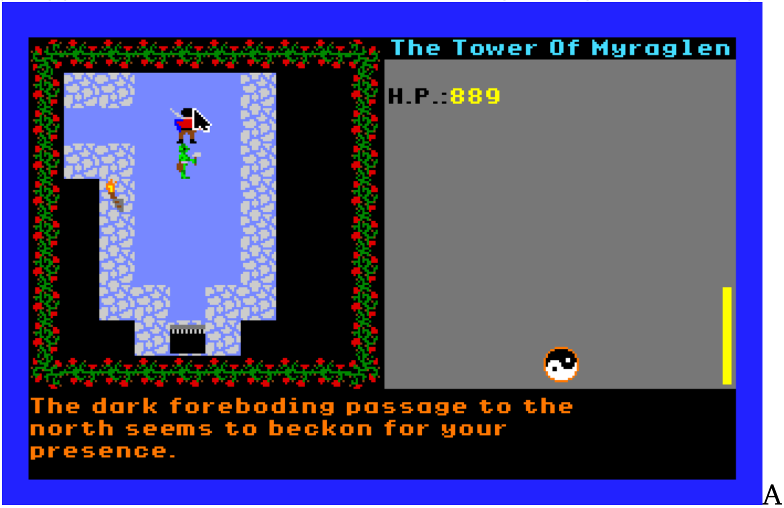
- While at T/Maker Corporation, Roizen concurrently served as president of the Software Publishers Association from 1988 to 1990. The SPA was a longtime *Computer Chronicles* presenting sponsor, and Roizen will make multiple future appearances on the show in her SPA role.
- Dave Dell'Aquila remained with ACI US until 1990. He later co-founded and served as vice president of Rae Technology, Inc., a short-lived software company spun-off from Apple that developed early website development technology. More recently, Dell'Aquila spent seven years at Apple itself as a user-interface designer for the company's internal content management system.
- Marney Morris continued to run Animatrix until its closing in 2017. During its three-decade history, Morris and Animatrix developed animation and web projects for a number of major corporations and nonprofit organizations. In 1998, Morris launched an interactive software product for children called *Sprocketworks* that she later distributed as freeware.
- Charlie Oppenheimer previously appear on *Computer Chronicles* in May 1987 to demonstrate the Macintosh SE.



Select 1st tile.

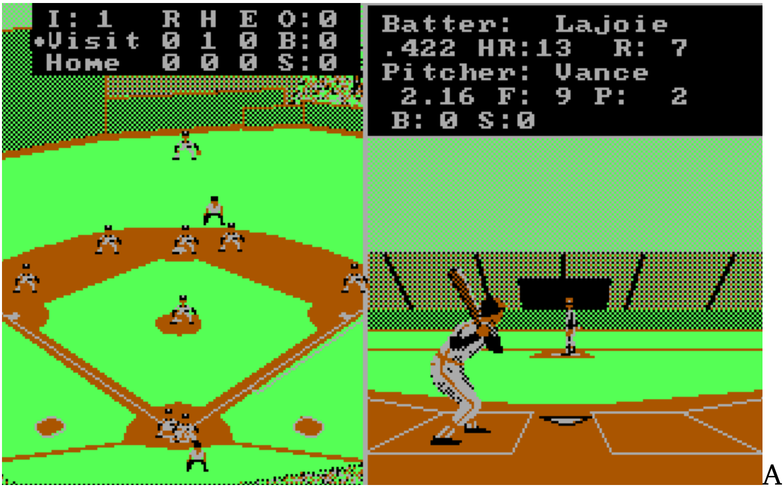
Tiles left: 144

A screen from “Shanghai” on an Apple IIgs emulator showing mahjongg tiles stacked at the beginning of a game.

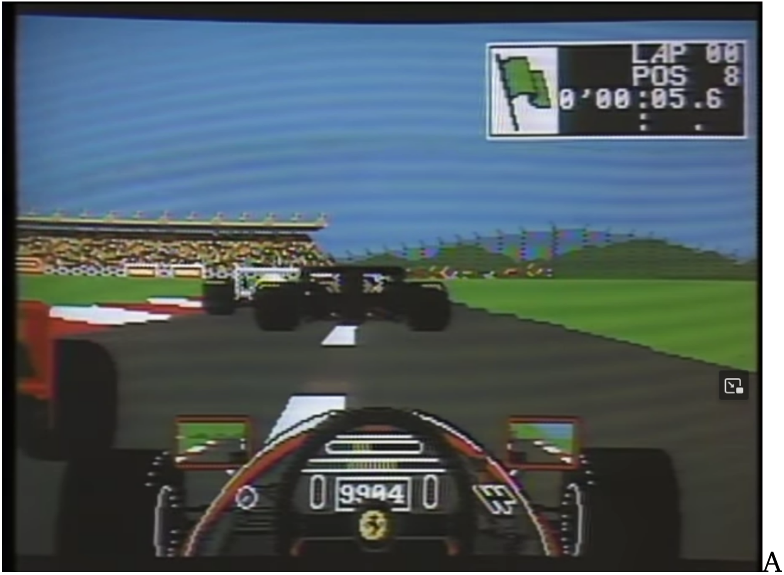


The dark foreboding passage to the north seems to beckon for your presence.

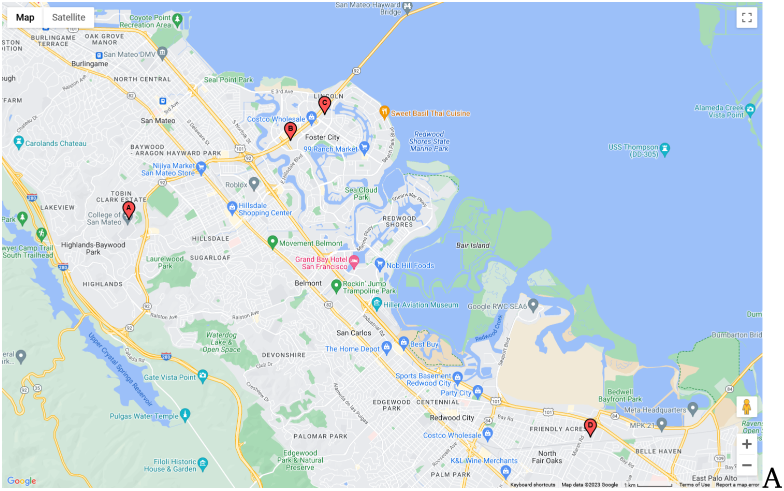
A screen from “The Tower of Myraglen” running on an Apple IIgs emulator. The bottom of the screen displays game text: “The dark foreboding passage to the north seems to beckon for your presnce.” The top of the screen is divided into two halves. The left half displays an overhead view of the game map with sprites representing the player and a monster fighting in a dungeon. The right half displays the player’s total remaining hit points.



A screen from “Earl Weaver Baseball” running in an MS-DOS emulator. The screen is divided into two halves. The left half shows an overhead view of a baseball diamond with a scoreboard at the top. The right half shows a third-person view of a batter facing a pitcher. The statistics for the pitcher and the batter are displayed in a separate text box.



A screenshot from the demonstration of “Ferrari Formula One” on “Computer Chronicles.” The screen shows a first-person view of a driver in the middle of a race. On the top left is a box with the lap number, the player’s current race position, and the time of the current lap.



A map of San Mateo, California, with pins indicating (a), the College of San Mateo, (b) PBI Software, (c) Electronic Arts, and (d) Activision.

Chapter 9: Computer Games I

Even in the late 1980s, two of the biggest names in third-party game development were Electronic Arts and Activision. As of this writing in July 2023, EA has a market valuation of around $38 billion. Meanwhile, Activision Blizzard, the successor to the original Activision, Inc., is in the final stages of a $75 billion acquisition by Microsoft. Of course, neither EA nor Activision were worth anywhere near that much at the time of this next *Computer Chronicles* episode from December 1987.

Indeed, at this point in history, EA was the larger and more successful company. But the computer games industry was also much, much smaller. EA, which had not yet gone public on the stock market, had leapfrogged Activision and Broderbund to become the number-one publisher in entertainment software, reporting $27 million in net sales and $5.2 million in profit for the 1987 fiscal year. (For the 2022 fiscal year, EA's net sales were over $7.5 billion.) In September 1987, Wendy Woods reported that EA now had 150 employees versus just 91 a year earlier. (Today that number is around 13,000.) And the company had the top-selling titles on three different platforms: *Chuck Yeager's Advanced Flight Trainer* on the IBM PC, *Legacy of the Ancients* on the Commodore 64, and *Earl Weaver Baseball* on the Amiga.

Two of those three programs would be featured over the next two *Chronicles* episodes, which comprised an hour-long look at computer games, the first time the show had revisited the subject since January 1985. To begin this first part, Stewart Cheifet showed Gary Kildall a regular chess board. Cheifet noted that chess was an ancient game. But then he displayed a small handheld computer that could beat a human player in chess. Hey then opened up the computer to show just how compact the electronics inside were. (The coin cell battery was bigger than the microchip!)

Cheifet continued that some people might consider talking about game software "frivolous." But from a programmer's point of view, the challenges of writing a game were much the same as for writing business software. Kildall said there were a lot of similarities but also a lot of differences. In the case of business software, the coding was often very file-intensive. And in the case of game software, it was often real-time because the player expected an instant response. For that reason, games were often written in assembly language and time-critical sections had to be examined very carefully. But the newer machines with faster processors and high-resolution graphics gave us a whole new level of fun, educational games.

Bad Customer Service Experience Led to Text Adventure Game

Wendy Woods presented her first segment, which featured an interview with science fiction and computer game author Douglas Adams. Woods said that Adams, best known for *The Hitchhiker's Guide to the Galaxy*, a novel later turned into a successful text adventure game, had discovered a new way to "startle, befuddle, and astonish" his fans with his latest game called *Bureaucracy*. It was based on Adams' own experience trying to get his bank to acknowledge a change of address. Adams said that when the bank finally responded, they wrote a very apologetic letter saying it wouldn't happen again–but that letter was sent to the old address. This provided Adams with the basic premise of *Bureaucracy*. The object of the game was to get your bank to acknowledge your change of address card. And you "go through hell" in order to achieve that objective.

Woods said the inevitable outcome of *Bureaucracy* also reflected the exotic bureaucratic horrors faced by Adams while on a photography expedition to Madagascar. Adams then goes off on what I would consider a mildly racist diatribe that I won't recap. But suffice to say, *Bureaucracy* involved putting the player through a similar ordeal in a fictional country.

Introducing Mah-jongg to Western Computer Users

Moving on, Brodie Lockard and Lucy Bradshaw joined Cheifet and Kildall in the studio, Lockard was a computer programmer with Stanford University. Bradshaw was a developer with Activision. Lockard developed a game for Activision called *Shanghai*. (Lockard is a paraplegic, so Bradshaw was there to assist with the demonstration.)

Kildall asked Lockard how he came up with the concept for *Shanghai*. Lockard explained that he'd written the game several years ago on a mainframe. He'd hoped to port it to a microcomputer but was disappointed with the graphics resolution on earlier machines. But when the Macintosh came out, he finally saw an opportunity. So *Shanghai* was initially ported to the Mac.

Cheifet asked for a demonstration of *Shanghai*, in this case on an Apple IIgs (see below). Lockard explained that *Shanghai* was based on traditional mah-jongg tiles. The game consisted of a pile of 144 tiles arranged in a pyramid-like formation known as a *dragon*. The object of the game was to find matching tiles that were free, meaning they could slide off to the left or the right of the pile. Cheifet noted that some of the tiles were hidden underneath other tiles, so they weren't immediately visible to the player. Lockard said that was correct. He added that the arrangement of the tiles was randomized for each game.

Bradshaw demonstrated *Shanghai* throughout Lockard's explanation. Cheifet asked her to explain what she was doing. Bradshaw said she was looking for matching tile-pairs and clicking them to remove them from the board. You could either click both tiles and select a "remove" button that appeared on the screen, or simply double-click the second tile in the pair. The player could also select a menu option to pull up additional information on the mah-jongg tiles and the rules. There was also a "help" option that allowed an inexperienced player to "cheat" by showing possible moves.

Cheifet asked Lockard if he'd ever considered making a full version of mah-jongg for the computer as opposed to just this solitaire version. Lockard said he had, but that would be quite a bit more complicated as the full game required four players and there were annual changes to the international playing rules. Meanwhile, Bradshaw finished her demonstration game, which pulled up an image of a dragon as a reward screen.

Kildall said that *Shanghai* had a reputation for being relaxing rather than competitive. Why was that? Lockard said the game was very easy to learn and it was pleasing to look at the tiles. There wasn't any fast action or timing, although you could have the program time your game. Kildall asked what language *Shanghai* was written in. Lockard said it was written in C.

Cheifet asked Lockard if he was working on any other computer games. Lockard said he was just finishing up a game called *Solitaire Royale*, a collection of single-player card games. He was also writing that program for the Macintosh, but an IBM PC port would be available.

Apple IIgs Game Emphasized Stereo Sound Effects

Richard L. Seaborne and Jeff A. Lefferts joined Cheifet and Kildall for the next segment. Seaborne and Lefferts developed an Apple IIgs game, *Tower of Myraglen*, for PBI Software, Inc. Seaborne was the developer and programmer, while Lefferts designed the graphics.

Kildall opened by noting that *Myraglen* used a special sound board. How was the sound actually stored in the IIgs? Seaborne said the sound was stored in digitized data. They took an audio source, such as a tape or stereo playback, and effectively recorded that into the computer's RAM through the board.

Kildall then asked about the game itself. Seaborne said that in *Myraglen*, the player was in the role of a "knight of justice" who entered the titular tower to prove they were good, justified, intelligent, and strong. (I just want to point out that Seaborne was a teenager at the time of this episode.) The goal was to battle various monsters and work through the tower in order to obtain a medallion.

Cheifet asked for a demonstration of *Myraglen* (see below), and specifically how the game used sound. Seaborne said that sound effects were used to accompany most common player actions. For instance, if a player closed a door there was a slamming sound. Each individual monster in the game also had their own roar or scream. He then showed an example in the game, entering a room with several monsters, battling them, and ultimately dying. Lefferts added that each of the sounds heard had been digitized through a tape player.

Next, Cheifet asked for an explanation on how sounds were re-used within the game. Seaborne said that sound data could be used over and over again. For instance, you could play sounds back at a faster rate so they were interpreted differently by the player. So you could speed up the sound of a monster's roar to indicate a smaller creature with a higher-pitched voice. Or a ghost's moan could be sped up to create a rat's squeak.

Cheifet noted there were a lot of adventure-fantasy computer games on the market. What really distinguished *Myraglen*? Seaborne said other games had taken one of two approaches:

Either take an existing game and make it better, or do something entirely new. Seaborne said *Myraglen* took all of the advantages from the good games on the market and put them into one game. (Again, folks, he was a teenager.)

Cheifet asked about the memory demands of *Myraglen* given all the digitized sound. Seaborne said the game itself worked on an Apple IIgs with 512KB of RAM. Lefferts said the add-on stereo sound card ran about $60. You didn't need the card to run the game, of course, but it enabled the player to experience the stereo sound effects. Seaborne added that additional system memory also allowed you to access more sounds. On lower-memory computers, some sound effects were shortened or removed.

EA Customer Service Dealt With Eaten Disks, Irate Parents

Wendy Woods presented her second remote segment, which featured the customer support department at Electronic Arts in San Mateo. Over some B-roll of an EA employee named Michael, Woods explained that he was one of 15 customer support people manning the phones at EA. Their job was to answer any questions about the firm's 64 game titles across a range of 7 different computers. How did they do that?

Paulette Doudell, EA's customer support manager, told Woods that all of the customer reps had booted up each of the game titles at some point in their career. And since EA did its own in-house testing before every product shipped, Doudell said there were eight experts on staff that had spent 40 to 80 hours with the game and developed a testing plan. So within the first five weeks of shipping, they knew every potential question that might come up during the life of the product. And just in case human memory failed, Woods said, the customer reps had extensive libraries of game clues and technical solutions at their fingertips.

Woods said that among the strangest calls EA received was the one about the dog that ate the *Starflight* disk. It was replaced free of charge. And then there was the distraught father whose kid ran up a $300 phone bill trying to solve *The Bard's Tale*. Doudell said they actually received calls from numerous parents who wanted to know who EA was. But luckily, the kids usually managed to solve the game before the phone bill caught up to them. And surprisingly, Woods said that most of the 500 calls that EA logged each week came from adults rather than children.

Electronic Arts Focused on Sports Simulations

Eddie Dombrower and Rich Hilleman joined Cheifet and Kildall for the final segment. Dombrower was president of Mirage Graphics, which developed the game *Earl Weaver Baseball* (EWB) for Electronic Arts. Hilleman was an associate producer at EA who worked on the game *Ferrari Formula One*.

Kildall asked Dombrower how EWB difered from previous computer baseball games. Dombrower said the fundamental difference was that both EWB and *Formula One* used physical models of the real world. So all of the action was happening in this "real world," and the screen graphics were updated to let the player know what was going on. Kildall asked for an example. Dombrower said in the real world, a baseball fell at 32 feet per second squared. So when the player hit a home run in EWB, the software calculated the trajectory and velocity accounting for that physical constraint.

Cheifet noted the game was named for Earl Weaver, a famous real-life Major League Baseball manager. Did Weaver actually play a role in developing the game? Dombrower said that Weaver played a very large role. Weaver met with Dombrower about five times and they spent a lot of time talking strategies, such as offensive and defensive plays and roster selection. Weaver also play-tested the game during development and gave feedback.

Kildall asked for a demonstration of EWB running on an Amiga 1000. Dombrower pulled up a sample game in-progress. It was the bottom of the eighth inning in a game between two fictional teams composed of National League all-stars from 1961 to 1975 and American League all-stars from 1900 to 1930. “Earl Weaver” (the computer) managed the NL while Dombrower managed the AL. Babe Ruth was at-bat for the AL. Tris Speaker, the tying run, was on third base. Dombrower said that Speaker wasn’t rated as a fast runner, so he used the interface to replace Speaker with another player. You could pull up a screen with the new player’s statistics. Dombrower noted there were over 40 statistical categories for each player in the game.

After completing his player swap, Dombrower switched to the main game action screen. This showed an overhead view of the baseball diamond. Cheifet asked if this represented a specific stadium. Dombrower said it was the Polo Grounds (the former New York Giants baseball stadium). But you could choose from a wide range of real and fictional ballparks. The player could also design their own ballpark. This was made possible by the use of real physics models in the game.

Continuing the demo, Dombrower showed a play selection menu. The game then presented a split screen with the overhead diamond view on the left and a third-person perspective from behind the batter on the right (see below). Sandy Koufax, the NL pitcher, pitched to Babe Ruth, and struck him out to end the eighth inning. Cheifet pointed out this was a “one-pitch” mode for EWB. Dombrower said this allowed a player to complete a game more quickly, but there was also a mode that let you experience every single pitch, which could take up to three hours. Dombrower also showed the game’s slow-motion “instant replay” feature and how the manager might come out to “argue” a call with the umpire.

Cheifet clarified that the simulation dictated the outcome of these plays. Dombrower said yes, the player’s statistics, ratings, wind conditions, field type, and the distances of the fences all affected the outcome of each individual play and game. Everything was also “rolled up” in a random number generator so the outcomes would be different every time.

Cheifet added that EWB featured a lot of digitized sounds. What role did those play in the game? Dombrower said the goal was to make the game feel as much like a television experience as possible. Sounds were a major part of that. Teri Mason, one of the programmers on EWB, integrated the crowd sound effects and the umpire–those were digitized samples–with the voice of an announcer, which was synthesized by the Amiga.

Turning to Hilleman, Cheifet asked about the development of *Ferrari Formula One* (FF1). Hilleman said the game was designed to be a grand prix simulation as opposed to a racing game. So the development team spent a great deal of time learning about the Ferrari F186, the car developed for the 1986 Formula One season, as well as the individual tracks and drivers from the circuit that year. So the game included a lot of the engineering necessary to set up cars to run on those different tracks.

Cheifet asked for a demonstration of FF1. Hilleman pulled up a screen representing the paddock, or the main garage areas of a racetrack. This functioned as a point-and-click main menu. The screen showed the current race track and weather conditions. The player could select the number of laps for the race. There were other options for the garage, transportation (to change tracks), race control (to go to the actual race), and the pits.

Hilleman selected the pits option, which pulled up a screen showing a F186 car preparing for a race. There was a built-in "computer crew chief" who could automate the setup process for the player. Hilleman then showed an automated demonstration of the actual race (see below), which was in first-person perspective. If the player wished to drive the car manually, they did so using the mouse, with the right button functioning as the accelerator and the left button as the brake.

Cheifet noted the car included rear-view mirrors that actually displayed what was behind the player. Hilleman added the dashboard was also copied from the F186. (It should be noted the framerate on this game was comically low, maybe 10 FPS at best.) Hilleman noted FF1 was different than most games in that the goal wasn't to win a single race but rather compete over an entire season. So if you crashed your car during a race, for instance, it could knock you out from anywhere between one day to the entire simulated season.

Kildall asked if there was some degree of randomness to the game to guarantee a different ride each time. Hilleman said that Rick Koenig, who designed FF1 and its physics model, did some data analysis on real-world drivers and discovered the “factor of error” they had, so that was built into each of the computer opponents.

Demise of Mattel Electronics Helped Fuel Rise of EA Sports

One day in 1971, a student at Pomona College in Claremont, California, named Don Daglow walked down the the hallway of his dorm when he heard what he later described as “clackety-clack” noises coming from a storage room. He walked into the room and found a makeshift computer lab with two terminals connected to Digital Equipment Corporation PDP-10 mainframe. Daglow, a playwrighting major, had no prior computer experience. But the student on-duty invited him to come in and learn more.

Daglow quickly took to his new hobby as a computer programmer. He’d spend the next nine years working on a baseball simulation game for the PDP-10. (Daglow kept his computer access through graduate school and a stint as a part-time instructor at Pomona.) Developing computer games wasn’t the most promising career path in the late 1970s, however, so Daglow ended up taking a job as a public school teacher after finally leaving Pomona.

But a subsequent promotion into school administration left Daglow frustrated. He was driving home from work one day when he heard an ad on the radio for Mattel Electronics. Mattel was then in the process of marketing the IntelliVision, a home video game console, and the company needed to build a programming staff to develop game cartridges. Daglow called the number in the ad and got himself hired as a game designer. He then quickly advanced to become director of game development for the IntelliVision.

One of Daglow's first programming hires was Eddie Dombrower. You may recall that Dombrower previously appeared on *Computer Chronicles* in March 1987. In that episode, he demonstrated a dance notation program that he'd written for the Apple II. Dombrower was an accomplished ballet dancer who had helped pioneer the use of computer software in choreography.

Dombrower was also a former high school baseball player and, like his new boss Daglow, still a big fan of the game. So Daglow put Dombrower to work on a new baseball game for the IntelliVision, which would be released in 1983 as *World Series Major League Baseball*. As Daglow later explained in an interview with Bethesda Softworks co-founder Christopher Weaver, Dombrower's combined background in dance and programming made him uniquely qualified in helping to produce a more accurate baseball simulation, particularly with respect to depicting the actual movement of the players:

> I thought, "I need a different kind of engineer. Here is a guy [Dombrower] who loves baseball, clearly is a really solid programmer, and he understands the movement of the human body the way we are going to have to understand it if we are going to make these blocky figures turn into something you believe are baseball players." And so, the old thing, when you find the perfect person to work with. We brought him in, trained him on the IntelliVision, and his ideas of how the game could work did work. It was the first use of camera angles in video games with this idea of being able to switch the camera angle and do the insets and imitate television coverage. But without Eddie's understanding of the human form and his engineering ability, it would have been a lovely theory, but we never could have made it look as good as it needed to look.

Unlike other commercially available baseball games of the time, Daglow built an actual statistical simulation for *World Series Major League Baseball*, which no doubt borrowed from the years he'd spent developing his original baseball game on the PDP-10. The finished game had a Major League Baseball license, but due to a last-minute snafu Daglow couldn't use the names of real players, just their statistics. So many of the in-game player names were based on those of the development team.

Unfortunately, by the time the game came out, Mattel Electronics had started to collapse along with the rest of the North American home video game console market. As the ship started to sink, Daglow secured a lifeboat from former *Chronicles* guest Trip Hawkins, who was just launching Electronic Arts. Daglow became one of EA's first producers, a new concept in game development that Hawkins modeled on the record industry. (Hawkins' counterpart at Activision, James Levy, implemented a similar producer system around the same time.)

In the early, pre-IPO days of EA, individual producers had substantial leeway in selecting projects. As I discussed in an earlier post, one of Daglow's pet projects at EA was *Thomas M. Disch's Amnesia*, which was the only purely text adventure game the company ever released in this period. Daglow was a fan of Disch, a mercurial science fiction authort, and picked up *Amnesia* after the original publisher dropped the project. That game ended up not being a major success for EA for reasons I discussed in my prior post.

Daglow also brought Dombrower into the EA fold to develop a new baseball game, which in many respects built upon the work they'd already done with *World Series Major League Baseball*. According to Daglow, he designed the underlying baseball simulation while Dombrower handled the programming. (This was, strictly speaking, against company policy, as EA forbade their producers from engaging in actual game development.) Daglow ended up leaving EA for Broderbund before the finished product–*Earl Weaver Baseball*–finally shipped, however, so he was only given a "special thanks" credit in the manual.

Unlike *Amnesia*, *Earl Weaver Baseball* was an unqualified success for EA. The company sold 50,000 units–the threshold for a silver award from the Software Publishers Association at the time–in less than a year. Domrbower and his company, Mirage Graphics, would go on to develop a sequel, *Earl Weaver Baseball II*, which EA published in 1991. Many years later, in 2009, Dombrower released *EWB Baseball*, which he dubbed a “spiritual successor” to the original game as a port for the iPhone.

As for the other EA game featured in this episode, *Ferrari Formula One*, that also had Don Daglow’s fingerprints. FF1 was developed by Rick Koenig, who previously worked for Daglow at Mattel Electronics. Koenig developed a racing game for the IntelliVision called *Motorcross*. His first project for EA was the 1987 Commodore 64 game *Racing Destruction Set*, which Daglow produced. Koenig then developed *Ferrari Formula One* as a follow-up.

Shanghai a Commercial Success for Struggling Activision

Brodie Lockard attended Stanford University where he earned a degree in mathematical science. He attended school on a combined academic-athletic scholarship and, with respect to the latter, was a member of the gymnastics team. While practicing a routine dismount from a trampoline in December 1979, Lockard’s “head went one way, the whole weight of his body the other,” as he landed in foam-filled pit, according to a 1988 report in the *Arizona Daily Star*. The fall permanently paralyzed Lockard below the neck.

Lockard had taken several computer programming classes prior to his accident. As he spent nine months recovering in the hospital, he obtained access to a terminal connected to the Control Data Corporation’s PLATO system, which he used to developed *Shanghai* . As Lockard could no longer type with his hands, he used a special mouthstick and headset that enabled him to program the entire game in C. After returning to Stanford and completing his master’s degree in computer science in 1984, Lockard ported *Shanghai* to the original Macintosh, which had the graphical resolution necessary to display the mah-jongg tiles.

According to video game historian Alexander Smith, Lockard came to the attention of Brad Fregger, a former corporate trainer for Atari, Inc., and Activision who had transitioned to a producer's role with the latter. Fregger called Lockard to arrange a breakfast meeting to discuss Lockard's programming work. But Fregger forgot about the meeting. Feeling guilty, he called to reschedule and the two met at the home of Lockard's parents. It was at that meeting when Fregger learned about Lockard's accident and quadriplegia.

Lockard's academic programming work at Stanford didn't exactly meet Activision's commercial needs. But Fregger promised Lockard Activision would publish any game he might come up with in the future. Six months later, Lockard contacted Fregger and told him he had something. The two met again on Christmas Eve. Lockard showed him *Shanghai*.

While Freeger was initially unsure this was the kind of game that would sell, he felt obligated enough to Lockard to honor his prior commitment. As it turned out, Freeger's wife and mother both played the *Shanghai* prototype and loved it. Freeger saw a similar reaction among his Activision colleagues. The company published the finished game in 1986 and it proved to be a hit. Lockard told the *Arizona Daily Star* that Activision had sold over 100,000 copies of *Shanghai* on multiple platforms by the the end of 1987. By 1991, that figure rose to over 500,000.

Activision certainly needed the success. At the beginning of 1987, the company's board fired founding CEO James Levy and settled a shareholder class action for $5 million. Activision had been losing money for four years at this point, reporting a $3.9 million quarterly loss in February 1988. Much of that loss was attributed to Levy's decision to have Activision acquire Infocom the previous year. Infocom was a Massachusetts-based publisher of text adventure games including the Douglas Adams *Bureaucracy* game featured in this episode.

Jimmy Maher of *The Digital Antiquarian* authored an exhaustive history of *Bureaucracy* in 2015. To briefly summarize, the game took nearly two years to develop. This was largely due to Adams' own laziness as a writer. Infocom originally signed a six-game deal to convert Adams' wildly popular *Hitchhiker's Guide to the Galaxy* novels into a series of text adventure games. The first–and what would beo only–game was a major hit, reaching 250,000 copies sold by February 1987. But Adams showed little interest in working on the sequels, instead dragooning Infocom into developing a game based on the petty inconvenience of his bank not properly handling a change of address form.

Bureaucracy sold about 30,000 copies, according to Maher. This was actually a decent showing by Infocom text adventure game standards, although it was only about one-tenth the sales of the *Hitchhiker's Guide* game. And Infocom never got its sequels to that game. I won't go into the history of Infocom at this time, but suffice to say that Bruce Davis, Jim Levy's successor as Activision's CEO, shut the subsidiary down in 1989.

PBI Software Turned "Pirates" into Third-Party Apple Developers

The final company featured in this episode, PBI Software, was something of a mystery to me at first. I wasn't even sure how this company came to the attention of the *Computer Chronicles* staff. Then I looked at map and discovered that PBI's offices were only about a mile away from the College of San Mateo, where *Chronicles* taped at the time. Indeed, PBI, Electronic Arts, and Activision were all located in roughly the same neighborhood, as you can see from this map below.

PBI Software was the creation of William Low, whom I had a chance to interview in researching this post. Low recalled to me that PBI came out of his association with a number of early computer hackers and software "pirates," including yet another former *Chronicles* guest, John Draper. Low had been talking to one of his hacker associates, known as "Mr. Crackman," about attending an upcoming National Computer Conference. (Based on the timeline and available news reports, I think this was the May 1983 National Computer Conference in Anaheim, California.) Mr. Crackman gave Low a number of technical questions to ask the Apple staff attending the conference. But when Low actually started talking to the engineers at the Apple booth, they quickly recognized these were questions that "only a pirate would ask."

Still, rather than dismiss Low, the Apple representatives asked if he knew any programmers. Low did. This led to a follow-up meeting where Apple asked Low if he'd be interested in developing a graphics package for their new Apple II office suite, *AppleWorks*. The Apple officials felt that business graphics (i.e., charts) were necessary to compete with the upstart spreadsheet *Lotus 1-2-3*. Low asked, "Well if it's such a good idea, why don't you guys do it?" The Apple folks replied, "We're after million-dollar ideas, not $100,000 ones." Low said he was happy to make $100,000, so he hired a teenage programmer and put him up in a hotel to create the graphics add-on, which Low published under the name *GraphWorks*.

Thereafter, PBI Software became a trusted third-party developer of hardware and software products for Apple. (Low established a second company, MDIdeas, Inc., to handle the hardware side.) Most of PBI's products focused on utility software, such as the first backup program for the Macintosh. The company's first published game was Peter Merrill's *Strategic Conquest*, which was featured in the second part of this *Computer Chronicles* look at gaming.

Tower of Myraglen, the game demonstrated in this episode, came out of MDIdeas' release of the SuperSonic sound card for the Apple IIgs. (The IIgs had a dedicated sound chip but could not produce sound in stereo without an add-on card.) In a 2015 interview with *RPG Codex*, Richard Seaborne said that *Myraglen* started out as a a *Dungeons & Dragons* module he wrote as a teenager. He'd actually submitted the module to TSR Hobbies, Inc., the publisher of D&D, but they rejected it. He also tried getting some early computer games for the Apple II published, again without success.

While still in high school, Seaborne worked a summer job to earn the money to buy the Apple IIgs. He then "translated" his

Myraglen D&D module into a IIgs game. He asked a high school friend, Jeff Lefferts, to create the art. Seaborne then decided to try and sell his half-finished game to Electronic Arts. He lived a couple hours away from EA's offices in San Mateo, so he got in his car and planned to just show up at EA and hoped that his prototype would impress them enough to buy it.

But along the way, Seaborne got lost and couldn't find the EA offices. He ended at PBI instead. (He recognized the name from seeing their ads in computer magazines.) So he walked into PBI's lobby, where he said he ran into William Low, who agreed to look at the game on the spot. According to Seaborne, Low agreed to publish *Myraglen* if he added features to take advantage of the SuperSonic card. Seaborne agreed and signed a contract that day. (When I asked Low about *Myraglen's* origins, he could not recall the specifics but said he "pitched" Seaborne on the idea.)

Although *Myraglen* had its roots in role playing games, the finished product is billed as "an action adventure fantasy game." While probably not a direct inspiration, it resembles and plays like a much-less polished version of *The Legend of Zelda* on the Nintendo Entertainment System. Low could not recall specific sales figures for *Myraglen*–he said PBI Software sold about 250,000 copies of all its programs combined–but he had planned to release at least one sequel.

That never happened. Seaborne and Lefferts did develop two other games for PBI–a shoot-em up called *Sea Strike* and a collection of casino games called *Monte Carlo*–but they left the company under what Low described to me as less-than-amicable circumstances. Indeed, Low told me that Seaborne and Lefferts walked into his office and told them they were quitting to start their own game development company. At the time, they were still working on *Sea Strike* and *Monte Carlo*. They told Low they wouldn't complete those games unless he gave them a development system they could use at their new company. Low told me it was "extortion" but he agreed to their demands.

PBI Software only released seven games altogether. The company itself shut down in 1990. There was no bankruptcy or drama, Low told me. He simply never took the time to grow the company. He did enter talks with one group about a possible sale but that never materialized. And while he mentioned informal discussions with other potential buyers–including EA and Activision–at the end of the day he said he was in the business to "have fun" rather than worry about expansion.

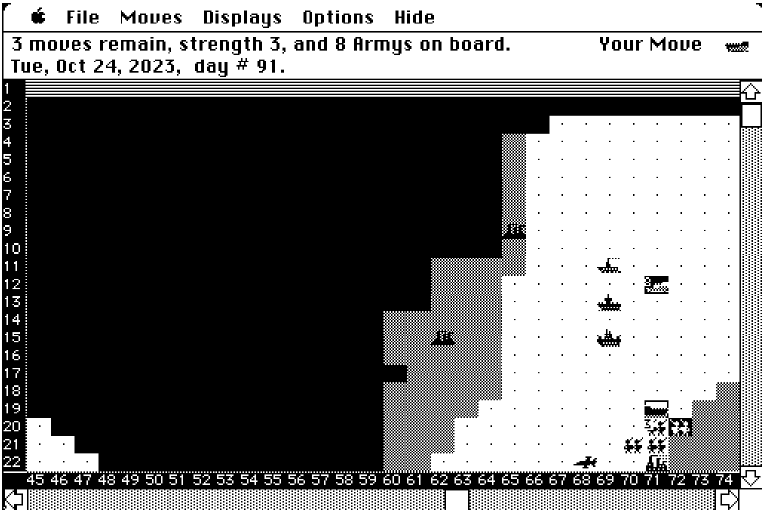
Notes from the Random Access File

- This episode is available at the Internet Archive and first aired during the week of December 16, 1987.
- Paul Schindler's software review for this episode was *Smartcom II*, $100 telecommunications package for the Macintosh published by Hayes Microcomputer.
- Douglas Adams died in 2001 at the age of 49. His only other computer game after *The Hitchhiker's Guide to the Galaxy* and *Bureaucracy* was *Starship Titanic*, an adventure game for Windows PCs published in 1998.
- Brodie Lockard enjoyed a long career as a freelance programmer and graphical user interface designer. In the 2010s he relocated to Hawaii, where he founded the local chapter of 350.org, an international climate change movement, and joined the board of Common Cause Hawaii.
- Lucy Bradshaw left Activision for Electronic Arts in the mid-1990s. After EA acquired Maxis, Inc., Bradshaw took over as its senior vice president and general manager, where she oversaw development of the *SimCity* and *The Sims* franchises (as well as *Spore*). Bradshaw left EA in 2015.
- After leaving PBI Software, Richard L. Seaborne created a pair of role playing games for the MS-DOS platform: *Prophecy I: The Fall of Trinadon* for Activision in 1989 and *Escape from Hell* for Electronic Arts in 1990. In 1992, he joined Tengen (Atari Games) where he oversaw development of a number of sports titles for consoles. He continued to work on the management side of games for the next two decades, including seven years at Electronic Arts and another six at Microsoft, before retiring in 2016.
- Jeff A. Lefferts joined Electronic Arts in 1993, where he

worked as a software engineer on a number of titles, mostly sports games, during the 1990s.

- Paulette Doudell rose through the ranks of EA and by the early 2000s was the company's vice president of worldwide studio operations.
- Eddie Dombrower switched from Electronic Arts to Activision in 1992. Two years later he joined the Jim Henson Company as vice president of its interactive division. After leaving the Henson Company in 1998 he bounced around a number of tech companies, including stints at E*Trade and Match.com. In 2017 he -cofounded Curve10, a digital products consulting company, where he has served as CEO since 2021.
- Richard Hilleman was one of the original employees of Electronic Arts, joining the company at its founding in late 1982. He spent 33 years at EA, rising to the position of vice president and chief creative officer in 2008. He left EA in 2016 to join Amazon Game Studios, where he remained until 2020.

Stewart Cheifet and Gary Kildall on the set of “Computer Chronicles” demonstrating the local area networking feature of “Falcon.”

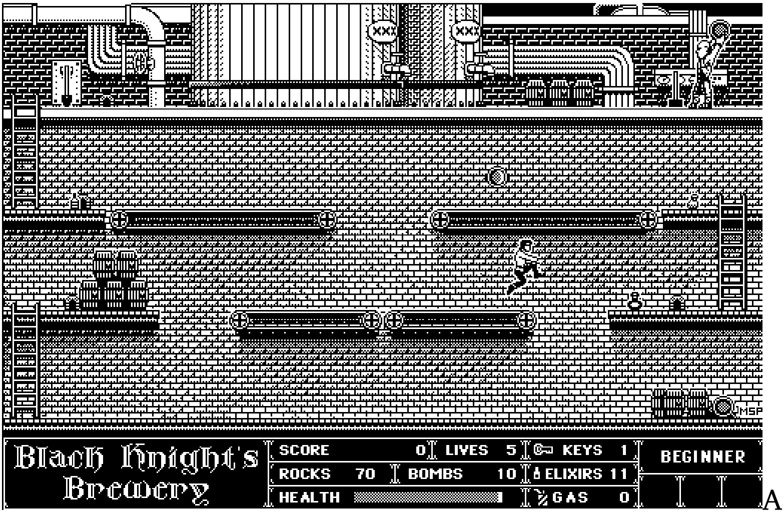


3 moves remain, strength 3, and 8 Armys on board.

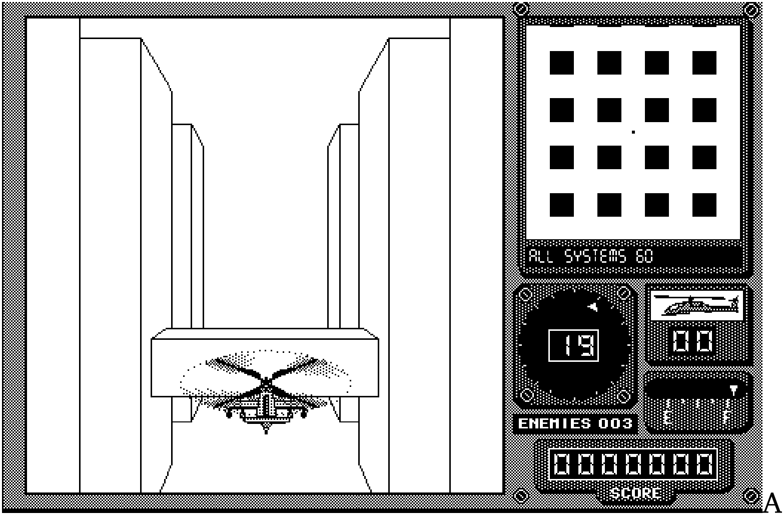
Your Move

Tue, Oct 24, 2023, day # 91.

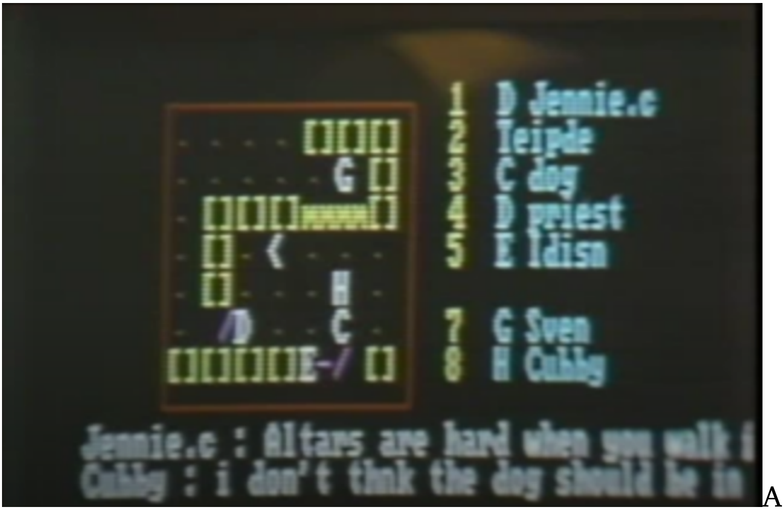
A screen from “Strategic Conquest” running on a Macintosh emulator.



A screen from “Beyond Dark Castle” running on a Macintosh emulator. The player character is in a room with multiple levels of platforms. The player is attempting to jump between platforms. On the bottom is the name of the room, “Black Knight’s Brewery” and basic player stats, including a health bar and their remaining ammunition.



A screen from “Apache Strike” running on a Macintosh emulator.



```
1 D Jennie.c
2 Teipde
3 C dog
4 D priest
5 E Idisn

7 G Sven
8 H Cubby

Jennie.c : Altars are hard when you walk i
Cubby : i don't think the dog should be in
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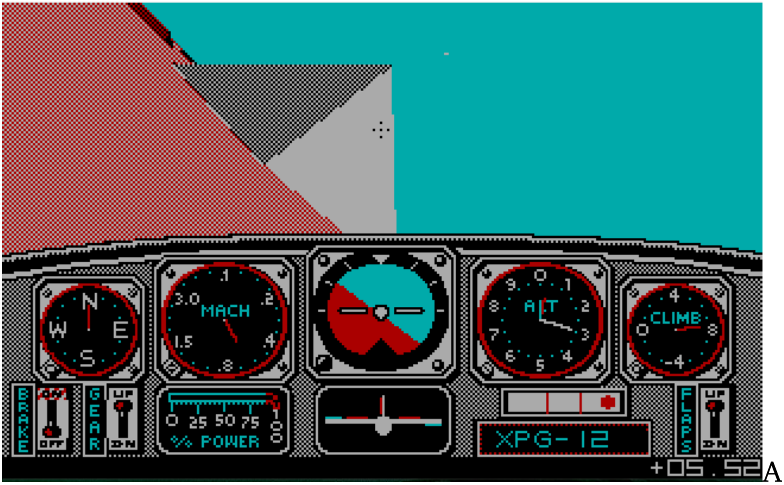
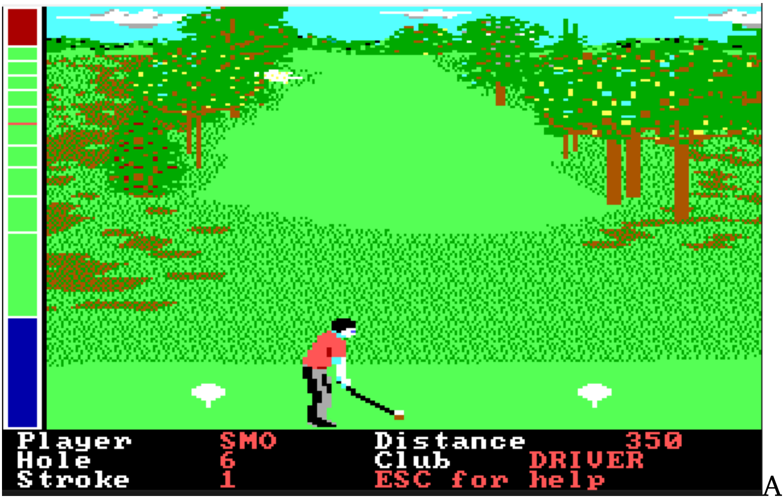
A screen capture showing “Island of Kesmai.” The screen shows a 7-by-7 grid representing a room in a dungeon. To the right is a list of player command options. On the bottom is text representing player chat.



A screen image from “Chuck Yeager’s Advanced Flight Trainer” running on an MS-DOS emulator. The screen shows a first-person view from inside an airplane cockpit as the plane flies over a fictional landscape dotted with pyramids.



Player SMO
Hole 6
Stroke 1
Distance 350
Club DRIVER
ESC for help

A screen image from “Mean 18” running on an MS-DOS emulator. The screen shows a player at the tee of a hole. On the bottom of the screen is information about the player, hole, distance to the pin, and club selection.

Chapter 10: Computer Games II

You always have to be cautious when declaring something was a “first” in video game history. But I think that Stewart Cheifet and Gary Kildall held what might have been the first nationally televised LAN party at the start of this December 1987 *Computer Chronicles* episode, the second in a two-part series on computer games. The dynamic duo demonstrated *Falcon*, an F-16 combat flight simulator published by Spectrum Holobyte. Cheifet explained the two PCs on the desk were networked so they could “see” each other. There was also a “flight recorder” built-in to the game so that if either player crashed, they could go back and see what they did wrong.

Cheifet noted that while these games were sophisticated, some parents worried that their kids spent too much time playing them. Kildall retorted that many computer games were educational. For example, games were often a child’s first exposure to using a computer, so it taught them skills like using a mouse. It could also help improve hand-eye coordination and problem solving skills. Some games even taught scientific concepts, such as *Asteroids* and the effects of gravitational pull. But Kildall conceded that based on the experiences of his own children, it was possible for kids to "O.D." on these games.

Could Computers Teach Kids Diplomacy?

Continuing with this idea of games as educational, Wendy Woods presented her first remote segment, narrating B-roll footage taken at Crocker Middle School in Hillsborough, California. Woods said that educational software had come a long way since the first math and spelling drills found their way into elementary schools. Teachers now had a choice of role-playing adventure games that both entertained and teached.

At Crocker Middle School, teacher Donna Howar used a game called *The Other Side* to simulate international conflicts. Howar told Woods her class focused on teaching problem-solving strategies. This included learning how to negotiate, how to work in a cooperative group, and how to make decisions together. Another goal was to learn how to organize and extrapolate information.

Woods explained that in *The Other Side*, two teams of four students tried to build a bridge to the other team's country. The teams competed for the needed resources and money. Players divided their time between the computer and a conference table, where they planned strategy and reviewed their progress. Howar noted that in her experience, students preferred to be put in a position where they were "acting" something out and there was some sort of reward.

While Howar's students might not be ready to work at the State Department, Woods quipped, the game seemed to be having an effect. During a recent summit between U.S. President Ronald Reagan and Soviet Union President Mikhail Gorbachev, the students discussed the likely strategies used by the two sides–not bad for a group of kids in their early teens.

Macintosh Gaming Featured Detailed Battle Sims, Interactive Cartoons

Peter Merrill and Eric Zocher joined Cheifet and Kildall back in the studio. Merrill was a software designer with PBI Software in Foster City, California. Zocher was vice president of development with Silicon Beach Software in San Diego, California.

Kildall opened by asking Merrill if kids were as caught-up in his game–*Strategic Conquest*–as they were other computer games? Merrill said definitely, although he emphasized this was a game that adults liked to play. *Strategic Conquest* was a strategy wargame for the Macintosh. He had a demo running in-studio on a Macintosh SE. The game screen consisted of a map divided into square sectors. Since the Macintosh had a monochrome display, water was represented in white, land was grey, and unexplored areas of the map were black. Various pixel-sized pieces dotted the map (see below). Merrill explained that you explored the map by moving those pieces.

Cheifet clarified this was not a map of the Earth. Merrill said the game map was produced using a random number generator. He continued the demo, explaining that he owned four islands on the map. The computer-controlled enemy owned two other islands. Merrill's strategy was to conquer one of those two islands. To do that, he loaded troops onto transport ships and dumped them off on a neighboring island in order to divert the enemy's attention. Meanwhile, Merrill loaded additional troops and dumped them on the island he wanted to conquer.

Merrill then switched to a different screen that showed the action of the battle. He noted that you could hear the sounds of the computer "jets" as they moved around the map. Although Merrill had the computer move the pieces automatically, he clarified that in normal play you would use the mouse to point-and-click where you wanted each unit to go. The battle map also displayed individual cities on the island. The player and enemy units on land were represented in white and black, respectively. In the demo, the player pieces were trying to capture the enemy's cities. Merrill said this was the key to the game, as cities produced more pieces. So the more cities you controlled, the more powerful you became. The ultimate goal was to capture all of your opponent's cities.

Cheifet then turned to Zocher and asked him to demonstrate the first of two Silicon Beach games, *Beyond Dark Castle*, which he had described as an "interactive cartoon" (see below). What did that mean? Zocher said it was like a cartoon experience in that there was a lot of detailed animation and a digitized soundtrack. Zocher than provided a demonstration on the Macintosh. (Again, this game is in black-and-white.) He entered the game's practice mode, which displayed the player character flying in the middle of a swamp. This was one of 14 "rooms" or levels in the game. The player had to defeat a flaming-eye enemy by throwing rocks at it. Zocher added that in another room, he could acquire a spell from a wizard to obtain fireball-throwing capabilities. The goal of this particular room was to get to the end of the level and acquire one of five magic orbs, which was necessary to win the game. After defeating the enemy, Zocher flew his character to a shack that contained the orb. He then picked up a new weapon and used it to fight an enemy guard wielding a mace.

Cheifet asked about another Silicon Beach game, *Apache Strike*, which involved flying a helicopter–but it wasn't a helicopter simulation. Zocher said it was an "action fantasy" game. He pulled up a demo on the Macintosh starting on level 20. The game showed a helicopter flying through a 3D wireframe model of a city (see below). Zocher explained you flew the helicopter using the mouse. The goal was to find a "strategic defense computer" while dodging fire from enemy tanks and helicopters. An indicator on the right told the player how many blocks they were from the computer. Cheifet noted there was a "cracked" screen on the right-side panel. Zocher said that was the player's radar screen, which had been damaged by enemy fire.

Cheifet noted there was a voice providing commentary. Zocher said that was "Linda," the player's on-board computer in the helicopter. It was actually the digitized voice of one of Silicon Beach's programmers.

Cheifet asked about the number of levels in the game. Zocher said you could go up indefinitely. There were 500 levels programmed in. The player could choose to start on levels 1, 20, or 40.

Kildall complimented the smooth animation in the game. How did they accomplish that? Zocher said this was 3D animation with hidden surface removal. He credited the programmer, Bill Appleton, with achieving 20 frames per second using this technique.

Cheifet asked Zocher about the "next step" in terms of computer game technology. Zocher said there was a new technology on the horizon called Compact Disc-Interactive (CD-I) that he thought had a possibility to produce a lot of interesting new games. (Spoiler: It didn't.) Kildall asked when CD-I might arrive on the consumer market. Zocher said he thought it would be by the end of 1988. (Spoiler: It wasn't.) Cheifet asked Merrill the same question: What was next for computer games? Merrill said he thought faster computers would mean better artificial intelligence in games.

CompuServe Banking on MUDs

Wendy Woods presented her second segment, which discussed *Island of Kesmai*, a Dungeons & Dragons-style game for the PC. Woods narrated B-roll of Michael Orkin, a statistician and former *Computer Chronicles* guest, playing *Kesmai* for the first time with two other players who were 2,000 miles away in real time via CompuServe. (It should be noted CompuServe was a presenting sponsor of *Computer Chronicles* for this season.)

Woods said that *Kesmai* was an example of a multi-user game. Several people could be online playing any one game simultaneously. These weren't arcade-type games with stunning graphics. The visual display had to consist of the basic characters that could be sent across the phone lines to all types of computers. So angle brackets, carets, dashes, and dollar signs represented doors, altars, or treasures (see below). But graphics were not the selling point of these multi-user games. Orkin told Woods that it was different–and fun–to do it this way.

Imagination was a big part of these games, Woods noted. Players could take on the identities of their alter egos. Getting hooked on this sort of game could be expensive, she added, but there were plenty of people willing to make that investment. Otherwise, CompuServe wouldn't be planning to offer more than the 30 online games it currently made available.

Advanced Flight and Golfing Sims

Ned Lerner and Jon Correll joined Cheifet and Kildall for the final segment. Lerner was a game designer with Electronic Arts. Correll was a product development manager with Accolade, Inc.

Lerner developed *Chuck Yeager's Advanced Flight Trainer* for EA. Kildall asked about the difference between a "flight trainer" and a "flight simulator." Lerner said *Flight Trainer* had more emphasis on instruction than previous programs. For instance, the game included a flight instruction sequence developed by a professional flight instructor.

Kildall, himself a licensed pilot, asked for a demonstration. Lerner pulled up a demo of an F-18 Hornet on the PC version of *Flight Trainer* (see below). The plane started inside of a hangar. Lerner powered up the plane and conducted a test flight. The game's landscape was a "fantasy" dotted with pyramid-shaped buildings. Lerner crashed the plane during the demo, which brought up a message from a digitized image of Chuck Yeager himself.

Continuing the demo, Lerner showed a "formation flying" mode where the goal was to fly an SR-71 Blackbird in formation with other planes. Kildall asked how much *Flight Trainer* actually helped someone learn to fly an airplane. Lerner said if you didn't know much about flying, the program could teach you how the plane handled and how the instruments worked. So it might save you 50 hours of classroom time.

Cheifet asked what role Chuck Yeager–a retired Air Force brigadier general who became the first pilot to break the sound barrier in 1947–actually played in the design of *Flight Trainer*. Lerner noted that Yeager was the world's most famous pilot. He helped EA pick the airplanes used in the program. Yeager also helped setup the training portion of the program. Kildall asked what other planes could be simulated in *Flight Trainer*. Lerner said the program included everything from World War I-era plans to experimental test planes.

Turning to Correll, Cheifet asked how you simulated golf on a computer using his company's program, *Mean 18*. Correll said it was probably a little easier than what Lerner did with *Flight Trainer*. *Mean 18* certainly didn't require as much concentration to play.

With that, Correll provided an extended demonstration of *Mean 18* on the PC (see below). He showed the main menu, which gave the player several options, such as practicing on a tee or green, or going right into the full game. He resumed a game that he previously started on the Pebble Beach Golf Links, one of the real-world golf courses included with the game. The player could use either the professional or regular tees. (The regular tees are closer to the hole.)

Correll played the 18th hole at Pebble Beach. He explained the computer recommended a golf club for each shot based on the remaining distance to the hole. The player could also press `Escape` to bring up a list of all of the various keyboard commands. But the basic game play only required three taps of the space bar to hit the ball. The first tap started the player's back swing. The second started the down swing. And the third determined if the player hit the ball straight or hooked it to the left or sliced to the right. Correll explained this setup was easy for new players to learn yet still required a good degree of timing to get the shot right. He then continued a fairly lengthy description of completing the hole, which I won't recap.

Cheifet noted there were four built-in courses that came with *Mean 18*. But it was also possible for the player to design their own courses. Correll said that was correct. *Mean 18* came with a "course architect" that allowed players to either create a new course or modify an existing one.

Macintosh Gaming Just Wasn't That Profitable

Strategic Conquest was the first game published by PBI Software, Inc., a company I discussed in the previous post. To briefly recap, William Low started PBI Software to develop third-party hardware and software for the Apple II and later the Macintosh. *Strategic Conquest* was a Macintosh clone of a game called *Empire* originally developed on the PLATO computer network.

Peter Merrill created *Strategic Conquest* on an Apple Lisa between 1984 and 1985 to run on the original Macintosh. Merrill began his career as a software engineer for the defense contractor Lockheed Martin. His brief foray into developing games included one other PBI title, a shooter called *Feathers & Space*, which came out in 1985. Around the time this episode aired in late 1987, Merrill joined Software Publishing Corporation, where he worked on *Harvard Graphics*, a business applications program. In 1991, Merrill joined Adobe, where he would spend the next three decades working as a manager and technical lead on several of the company's flagship products, including *Photoshop* and *Illustrator*. Since 2012, Merrill has served as a principal scientist at Adobe focused on digital imaging and video projects.

As for *Strategic Conquest*, it had a longer life than PBI Software. After Low closed PBI in 1990, the rights to *Strategic Conquest* passed to another small Macintosh-focused game developer, Delta Tao Software. Joe Williams and Tim Cotter founded Delta Tao in 1989 after successfully publishing an inexpensive Macintosh paint program. They continued to revise and expand *Strategic Conquest* through a 256-color 4.0 release in 1998.

Delta Tao also acquired the rights to another Macintosh game demonstrated in this episode, Silicon Beach Software's *Beyond Dark Castle*. The sequel to *Dark Castle*–which Paul Schindler reviewed back in September 1987–*Beyond Dark Castle* was considered a critical and commercial triumph. But it would also prove to be Silicon Beach's swan song when it came to the micro-niche of 1980s Macintosh gaming.

Journalist and video game historian Richard Moss published *The Secret History of Mac Gaming* in 2021, which contained an extended history of Silicon Beach Software. Charlie Jackson founded Silicon Beach in 1984. As Moss explained, Jackson was a former Marine who dreamed of being a national team athlete–he didn't care which sport. He ultimately settled on shooting, but he needed to make money to train. So he decided to start a software company focused on the new Macintosh computer.

Since Moss was no programmer, he hosted a local users group meeting at his San Diego home, where he met Eric Zocher. At the time, Zocher was studying computer science at the University of California, San Diego. Zocher agreed to work for Moss on the spot.

But as Peter Merrill had learned when creating *Strategic Conquest*, programming for the Macintosh in 1984 meant buying an expensive Apple Lisa, since that was the only development system available. Jackson used his life savings to buy the Lisa. And much like his PBI counterpart William Low, Jackson was happy to hire teenagers to program his games–in this case a high school student named Jonathan Gay, who developed Silicon Beach's first released game, *Airborne!*

Zocher created the sound effects for *Airborne!*, which Moss noted "drew lots of positive attention and buzz" when the game was demonstrated publicly at the first Macworld Expo in 1985. The game proved a hit at the show and with the small-but-loyal base of Macintosh users. Silicon Beach subsequently sold enough copies of *Airborne!* to establish itself as a legitimate developer.

Dark Castle came about after an experienced game designer named Mark Pierce joined the company. Pierce was one of the co-founders of MacroMind, a company I discussed in a recent post for its work in developing another early successful Macintosh program, *VideoWorks II*. According to Moss, Pierce left MacroMind after co-founder and president Marc Canter sold part of the company to his father-in-law in exchange for a badly-needed influx of capital, which of course diluted Pierece's ownership stake.

Initially, Jackson hired Pierce to create some animations and graphics that Silicon Beach could use to attract their own outside investors. Pleased with this work, Jackson and Zocher then pitched Pierce on their idea for a new platform game, which was loosely based on a "short-lived TV show about a family that stumbled through a portal, and a military board game called *TimeTripper*." Pierce thought this idea was "stupid and incoherent" and proceeded to create a storyboard for his own game, which became *Dark Castle*.

To make a long story short, Pierce took over the game design while Zocher handled the digitized sound effects, which included one of the earliest examples of voice acting in a computer game. (It also pioneered the use of the WASD control scheme, which was probably necessary since the original Macintosh had no arrow keys.) The finished game came out in 1986 to glowing reviews. Moss said that by the start of 1988, Silicon Beach had sold 30,000 copies of *Dark Castle* and the game would remain a best-seller on *Macworld*'s list of entertainment software for more than three years. *Beyond Dark Castle*–essentially a more difficult version of the original–enjoyed similar acclaim and commercial success.

Beyond Dark Castle would also be the final Silicon Beach game. Moss explained it came down to simple economics: Silicon Beach made far more money selling various graphics and utility programs for the Macintosh, such as *Digital Darkroom* and *SuperPaint*, than it did on games. Jackson saw where the wind was blowing and decided to shift focus away from games. And it paid off. In January 1990, Aldus Corporation purchased Silicon Beach Software from Jackson. That August, Aldus brought in Stephen Cullen, a former Software Publishing Corporation executive, to replace Jackson as general manager of what was now its Silicon Beach subsidiary.

The exact terms of the deal were not disclosed publicly at the time, but according to Moss, Jackson sold his company "for exactly the amount he needed in order to train in international style rapid-fire pistol shooting full-time." He would go on to complete that training and ultimately earned a spot on the U.S. national team for rapid fire pistol shooting in 1993 and 1994. Years later, Jackson created a new software company, also named Silicon Beach Software, which develops a 2D vector drawing program for Windows 10 machines.

As noted above, the rights to *Dark Castle*, like those of *Strategic Conquest*, ended up with Delta Tao Software. Delta Tao produced a full-color version of the game in the 1990s. A sequel, *Return to Dark Castle*, languished in development for several years before it was finally released in 2008 by Z Sculpt Entertainment.

Accolade's Journey from Sports Game Darling to Bobcat-Fueled Mania

Rex Bradford developed the golf game *Mean 18*. Bradford got his start as a programmer with the board game company Parker Brothers, which entered the Atari VCS (2600) cartridge market in 1981 at the height of that system's popularity. Bradford co-developed *The Empire Strikes Back*, a VCS game based on the popular *Star Wars* sequel, which Parker Brothers had licensed the rights to from Lucasfilm.

Bradford then had a brief stint at Activision before starting his own development company, Microsmiths, which he formed with a couple of former Parker Brothers colleagues. *Mean 18* would prove to be Microsmiths biggest hit. Bradford recalled the development history in a 1997 interview with Tim Duarte:

> At Microsmiths, what we did was a combination of original designs and "ports" of games for other publishers from one game system to another. While doing that work, I wrote *Mean 18* on nights and weekends in my spare time just as

> a labor of love, because I had always been a golf fanatic and wanted to do a computer golf game. I went to the [Consumer Electronics Show] in January 1986 with a nearly-completed game of *Mean 18* and Accolade among other companies were extremely interested in it. I struck a deal with them, finished up the game, and they published it and that was a very big game for several years.

Accolade, Inc., was founded in July 1985 by two programmers–Alan Miller and Bob Whitehead–who themselves had a long history with the VCS. Miller and Whitehead both joined Atari, Inc., in 1977 to program first-party games for the console. They subsequently joined fellow Atari programmers David Crane and Larry Kaplan in leaving the company at the end of 1979 to form the first third-party developer, Activision.

Initially, Activision saw great success with its own VCS releases. But then the North American home video game market collapsed in 1983–largely because of Atari–and while Activision managed to weather the storm and even held a successful initial public offering, the shift in the company's fortunes led to the departure of both Miller and Whitehead. As Whitehead recounted in a 2005 interview with *Digital Press*:

> We owned stock, [Activision CEO Jim Levy] had a little more than us designers, but the [venture capitalists] got the controlling interest. We were insiders, so selling stock was a no-no, but the market had turned and our stock was a tenth of what it was…and morale wasn't so good. We felt that diversification was a big part of the problem and computers, such as the [Commodore] 64, were a growing segment. And we weren't naive kids anymore– opportunity knocked!

To that end, Miller and Whitehead decided their new company, Accolade, would squarely focus on computer games rather than consoles. Miller told *Computer Gaming World* in 1986, "We started the company first and then we thought of game ideas for awhile before actually starting." Sports games quickly emerged as the company's specialty, which fit the co-founders backgrounds well. Miller had previously developed basketball and ice hockey games for the VCS, while Whitehead had done the same with boxing and skiing.

In 1985, Accolade released *Hardball!*, a Commodore 64 baseball game designed by Whitehead, which sold 80,000 copies in its first year. Accolade followed that up with a boxing game, *Fight Night*, before publishing Microsmiths' *Mean 18* for MS-DOS computers in March 1986. In its first four months, *Mean 18* sold over 20,000 copies, according to the *Sacramento Bee*, and Accolade would port it to a number of other platforms, including the Atari ST, Amiga, and Apple IIgs. By August 1988, *Mean 18* was certified "Gold" by the Software Publishers Association, meaning it had sold over 100,000 units across all platforms.

And while video and computer games based on golf were hardly new even in 1986, *Mean 18* was one of the first to feature a 3D perspective and employ the now-common three-click method for swinging the club. Accolade was also savvy in marketing a series of standalone expansion disks–the precursor to modern DLC–containing additional golf courses based on real-world venues.

Accolade followed up *Mean 18* with *Jack Nicklaus' Greatest 18 Holes of Major Championship Golf*, which was not developed by Microsmiths but effectively functioned as a sequel to Bradford's game. According to *Baltimore Evening Sun* writer Michael Himowitz, the *Nicklaus* game played "much like *Mean 18*, although I think Accolade made putting a little easier in this version." And unlike *Mean 18*, which came with four complete courses as part of the base game, *Nicklaus* only featured a single course, which was made up of individual holes taken from popular tournament courses like Pebble Beach Golf Links in California and the Old Course at St. Andrews in Scotland. (Obviously, Accolade also sold several expansion disks with additional courses.)

Accolade itself was also in the midst of a leadership transition during the 1987-88 period when this *Chronicles* episode aired. Miller and Whitehead initially recruited Thomas Frisina, who previously headed one of Atari founder Nolan Bushnell's many failed post-Atari ventures, as the founding CEO of Accolade. But Frisina resigned as Accolade CEO in 1987 to form his own game development company, Three-Sixty Pacific, which focused on wargames. (Three-Sixty actually did ports of Silicon Beach's *Dark Castle* for various non-Macintosh platforms.) Miller then took over as CEO for several months until Allan Epstein assumed the position.

Epstein's tenure at Accolade was defined by the company's move into home video game consoles. That didn't happen immediately, however, even as the Nintendo Entertainment System (NES) revived the dormant market with retailers in 1986 and 1987. A stumbling block for Accolade was Nintendo's strict control over the licensing of third-party NES games–enforced by a hardware "lockout chip." Dan Gutman, writing in the *Arizona Republic* in December 1988, reported that Accolade applied for a license the year before but was turned down by Nintendo. And even after Nintendo reconsidered, it insisted on restrictions that Epstein considered unfair, specifically limits on the number of titles the company could release and the total number of cartridges that could be manufactured (by Nintendo itself). In the end, Accolade ended up sub-licensing a handful of its existing titles to other publishers who ported them to the NES, including a 1990 conversion of the original *Jack Nicklaus* golf published by the Japanese developer Konami.

But Accolade was still determined to get Accolade onto consoles as a direct publisher with the Sega Genesis, which Sega Enterprises Ltd. released to the North American market in 1989. Sega initially tried to copy Nintendo's third-party licensing restrictions. And while Accolade entered negotiations with Sega, talks broke down when Epstein balked at Sega's demand that it manufacture all of the actual cartridges (as Nintendo did with the NES). But rather than walk away or rely on licensing its games to other publishers, Accolade decided to reverse engineer the Genesis.

This was not an uncommon practice in the video game market. Indeed, Activision had to reverse engineer the Atari VCS when it developed its first games back in 1980. And Accolade wasn't even the only company to reverse engineer the Genesis. Electronic Arts, which also chaffed at the licensing restrictions of Nintendo and Sega, did the same thing with the Genesis.

Sega ended up suing Accolade over its reverse engineering, however, alleging that Accolade violated Sega's copyrights and trademarks. Sega's case hinged on what it called the "trademark security system" (TMSS) a feature incorporated into a later revision of the Sega Genesis known as the Genesis III. TMSS checked for the word "SEGA" at a specific memory location on an inserted game cartridge. If the "SEGA" was present, the game was considered Genesis-compatible and booted with a title screen that said, "Produced by or under license from Sega Enterprises Ltd."

When Sega demonstrated the Genesis III at the winter 1991 Consumer Electronics Show, Accolade realized its cartridges no longer worked properly. So Accolade conducted a second round of reverse engineering, which was described in this 1992 opinion from the U.S. Ninth Circuit Court of Appeals in San Francisco:

> During the reverse engineering process, Accolade engineers had discovered a small segment of code — the TMSS initialization code — that was included in the "power-up" sequence of every Sega game, but that had no identifiable function. The games would operate on the original Genesis console even if the code segment was removed. Mike Lorenzen, the Accolade engineer with primary responsibility for reverse engineering the interface procedures for the Genesis console, sent a memo regarding the code segment to Alan Miller, his supervisor and the current president of Accolade, in which he noted that "it is possible that some future Sega peripheral device might require it for proper initialization."
>
> In the second round of reverse engineering, Accolade engineers focused on the code segment

> identified by Lorenzen. After further study, Accolade added the code to its development manual in the form of a standard header file to be used in all games. The file contains approximately twenty to twenty-five bytes of data. Each of Accolade's games contains a total of 500,000 to 1,500,000 bytes. According to Accolade employees, the header file is the only portion of Sega's code that Accolade copied into its own game programs.
>
> In 1991, Accolade released five more games for use with the Genesis III, "Star Control", "Hardball!", "Onslaught", "Turrican", and "Mike Ditka Power Football." With the exception of "Mike Ditka Power Football", all of those games, like "Ishido", had originally been developed and marketed for use with other hardware systems. All contained the standard header file that included the TMSS initialization code. According to Accolade, it did not learn until after the Genesis III was released on the market in September, 1991, that in addition to enabling its software to operate on the Genesis III, the header file caused the display of the Sega Message.

In April 1992, a federal judge issued an injunction against Accolade, holding that it had unlawfully infringed Sega's copyrights and trademarks, and ordered the company to recall all of its "infringing games" within 10 business days. The Ninth Circuit stayed that order and later reversed the district court and dissolved the injunction. Judge Stephen Reinhardt, writing for a three-judge panel of the Ninth Circuit, held that "when there is no other method of access to the computer that is known or readily available to rival cartridge manufacturers, the use of the initialization code by a rival does not violate the [Lanham] Act even though that use triggers a misleading trademark display." In other words, Sega could not force unlicensed developers who lawfully reverse engineered the Genesis from copying the TMSS code so that their cartridges would work, even though copying that code displayed a "false" trademark message.

Accolade and Sega ended up reaching an out-of-court settlement in May 1993. Under the deal, Accolade finally became a third-party licensee of Sega. But it was something of a Pyrrhic victory, as Accolade suffered a significant decline in sales during the two-year litigation . During this time, Allan Epstein had also left the company and Alan Miller again took over as CEO. Peter Harris, the former CEO of the FAO Schwarz toy store, would take over as CEO of Accolade for a year before turning over the reigns to chief operating officer Jim Barnett in 1995.

It was also in 1993 that Accolade attempted to launch its own mascot-themed console game franchise with a bobcat character known as "Bubsy." Accolade published *Bubsy in: Claws Encounters of the Funeral Kind* on both the Super Nintendo Entertainment System and Sega Genesis. The pre-release hype for *Bubsy* was substantial and, in retrospect, probably excessive. For example, London's *Daily Mirror* ran a preview proclaiming, "The ultimate video game hero is out to zap Mario and SOnic and reign supreme as the fans' No. 1. His name is Bubsy Bob Cat–and he aims to steal their thunder AND their sales." An Accolade spokesperson further bragged, "We have spent a fortune researching what players want in a character and left nothing to chance."

Accolade followed up that first *Bubsy* game with three sequels, none of which managed to live up to the initial hype. While the company continued to churn out games–notably its trademark sports titles–by the late 1990s the privately held Accolade struggled to stay afloat. In 1997, Electronic Arts became an investor in Accolade and took over its distribution. Two years later, in July 1999, French video game publisher Infogrames Entertainment SA purchased Accolade for $50 million (plus the assumption of another $10 million in debts). Infogrames later acquired the rotting corpse of Atari and subsequently assumed its name, becoming Atari SA. When that company filed for bankruptcy in 2013, the Accolade trademark and several of its games were sold off to pay creditors.

But because you cannot kill Atari with conventional weapons like bankruptcy, the company somehow survived, and in 2023, the most recent incarnation of Atari re-acquired the Accolade name and many of its games, including the *Bubsy* series and Alan Miller's original *Hardball!*

Lerner's Adventures Through the Looking Glass

Interestingly, when original *Mean 18* developer Rex Bradford closed his company Microsmiths in the mid-1990s, he ended up joining Looking Glass Studios, which was co-founded by a guest from this episode, *Chuck Yeager's Advanced Flight Trainer* developer Ned Lerner. Looking Glass actually grew out of Lerner's first company, Lerner Research, which developed the flight simulator for Electronic Arts.

Lerner graduated from Connecticut's Wesleyan University, where he met fellow student Paul Neurath, who founded Blue Sky Productions. Blue Sky famously developed the landmark 1992 game *Ultima Underworld: The Stygian Abyss* and its sequel for Origin Systems, which was later acquired by Electronic Arts. Also in 1992, Lerner and Nuerath decided to merge their companies, naming the combined entity Looking Glass Studios. That company shut down in May 2000.

While still working at Looking Glass, Lerner co-founded another startup, Multitude Communications, which developed Firetalk.com, an early attempt to build an online voice chat platform. The service only lasted until March 2001 after the parent company–later renamed Firetalk, Inc.–reportedly burned through $45 million in venture capital funding.

In the 2000s, Lerner returned to his game development routes. He had a brief stint as chief technology officer of EA's Maxis subsidiary in 2003 before joining Sony Worldwide Studios as its director engineering. In 2017, Lerner left Sony to start a new venture, Hearo.Live, a mobile app that lets users watch television programs together.

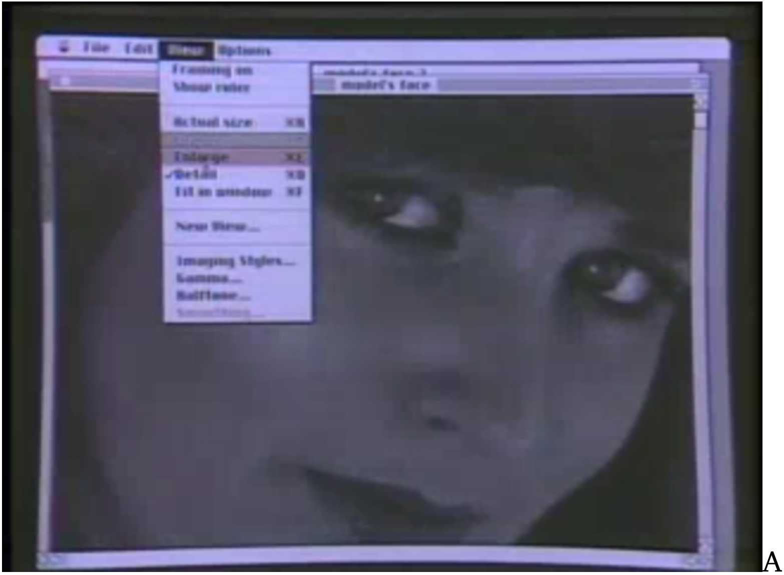
Notes from the Random Access File

- This episode is available at the Internet Archive and was first broadcast the week of December 23, 1987.
- Stewart Cheifet recorded the cold open for this episode at the offices of PBI Software in Foster City, California, which as I noted in the previous post was just down the street from the College of San Mateo where *Computer Chronicles* taped.
- Paul Schindler's software review for this episode was Infocom's *Leather Godesses of Phobos* ($50), which had recently been ported to the Macintosh.
- Eriz Zocher left Silicon Beach Software in 1989 to join Steve Jobs' NeXT Computer, where he oversaw development support for the NeXTSTEP operating system. A year later he joined Adobe Systems as its vice president of engineering, overseeing the applications division. He would go on to co-found a few different startups in the late 1990s and early 2000s before going to work for Microsoft, where he stayed for 10 years before becoming an independent developer in 2017.
- Gilman Louie created *Falcon* while completing a business degree at San Francisco State University in the early 1980s. He founded Nexa Corporation to publish the game. Nexa later merged with Coloardo-based Spectrum Holobyte, with Louie becoming the latter's chairman. *Falcon* was a major commercial and critical success for the company, winning three Software Publishers Association awards in 1988. Spectrum Holobyte developed a number of sequels, with *Falcon 4.0* being the final release in 1998. By that point, Spectrum Holobyte had acquired another developer of military combat simulators, MicroProse, and assumed its name. Hasbro Inc. then purchased MicroProse in 1998, and after the sale closed further development on the *Falcon* series ceased. But in May 2023 MicroProse–now an independent company again–announced it had re-acquired the *Falcon* series rights and planned to develop *Falcon 5.0* in the future.
- *The Other Side* was published by Tom Snyder Productions,

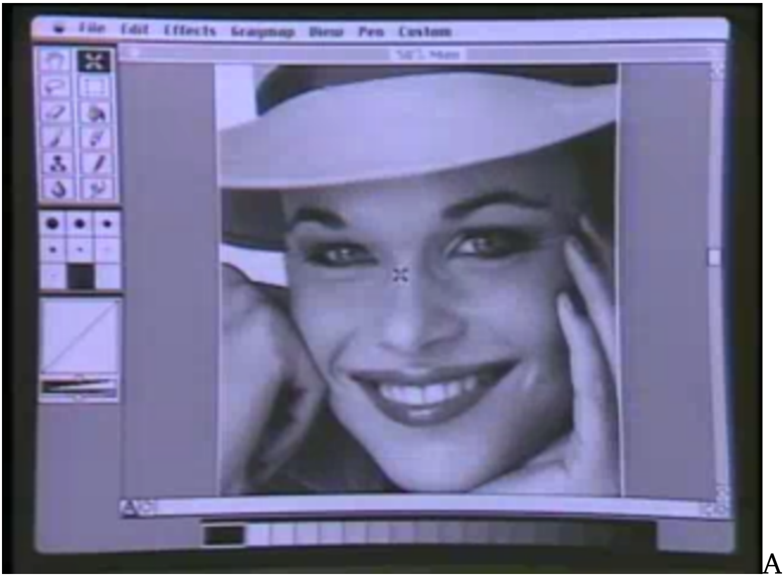
Inc. The company's founder and namesake–no relation to the former late-night talk show host–was a science and math teacher at a private school in Massachusetts in the late 1970s. In 1980, he founded Tom Snyder Productions with $30,000 in startup capital from the father of one his students. The company originally focused on developing educational software for the Apple II. Snyder later expanded into television production, most famously developing the Comedy Central animated series *Dr. Katz, Professional Therapist*. Bolstered by that show's success, Snyder sold his company to Canada-based Torstar Corporation in 1996 for an undisclosed amount of cash. Torstar later sold Tom Snyder Productions–renamed Soup2Nuts in 1999–to Scholastic Corporation in 2001 for $9 million. Scholastic closed Soup2Nuts in 2015.

- Kelton Flinn and John Taylor created the multi-user dungeon game *Island of Kesmai* while attending the University of Virginia. Jimmy Maher of *The Digital Antiquarian* delved into the game's development in some detail. Flinn and Taylor started a games company, also named Kesmai, which published a number of other early online multiplayer games such as *Megawars* and *Air Warrior*. News Corporation purchased the Charlottesville, Virginia-based Kesmai Corporation in 1994 for undisclosed terms. (News Corp. also owned the online service Delphi at the time.) News Corp. later sold Kesmai to–guess who–Electronic Arts in 1999. EA folded Kesmai's online gaming technology into EA.com and closed the Charlottesville studio in 2001.
- When Gary Kildall asked about the difference between a "flight simulator" and a "flight trainer," I assume he was needling Jon Correll about the fact EA had to change the name of its game after Microsoft–which published *Microsoft Flight Simulator*–objected to the use of the word "simulator" in a competing title.

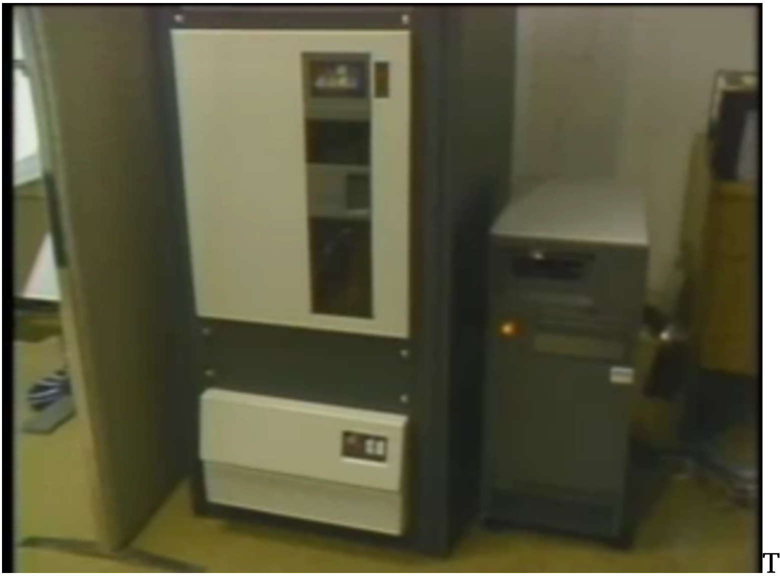
A hand holding up a piece of paper with the printed gray-scale image of a wrist watch.



A screenshot from a demonstration of “MacImage,” showing an image of a woman’s face in the main window. There is also a traditional Macintosh-style menu on the top with one of the sub-menus selected.



A screenshot of “ImageStudio.” In the main window is a closeup image of a woman wearing a fedora. A command palette is on the left side of the screen, and the Macintosh menu is on top.



The Pixar Image Computer.

Jennifer Moller with Gary Kildall on the set of “Computer Chronicles.” Moller is showing the “PicturePower” system, including a video monitor on the desk, a video camera, and a PC with a digital imaging expansion card.

Chapter 11: PC Imaging

Computer Chronicles began 1988 with a focus on desktop scanners and digital imaging software, a field still in its earliest stages at the personal computer level. Stewart Cheifet opened this episode by showing Gary Kildall a portable scanner that used Xerox copier technology. He pulled the scanner over a printed page, and it produced a CVS receipt-like printout right away.

Cheifet noted that everyone seemed to be into scanning these days. Why the sudden fascination with this technology? Kildall said desktop publishing was a prime reason. People wanted to incorporate more graphics into their text documents. A second reason was the growing popularity of fax machines. But the big movement was towards the digital representation of information in electronic form. That made it a lot easier to assemble information, put it together, alter it, and publish it. It was simply a more flexible way to deal with information.

The PC–Now with the Power of Facsimile!

Wendy Woods presented her first remote segment, narrating some B-roll footage taken at Inter-Ocean Leasing in San Francisco, California. Woods said Inter-Ocean leased containers for shipping cargo around the world. The firm had agents in 26 countries and it needed to communicate with those people every day.

The company used to rely on a Telex, Woods said. But it recently changed to a PC-based facsimile (fax). David Shakespeare, an Inter-Leasing vice president, told Woods there were two main advantages. One was that a fax system could transmit images, which was useful for sending things like contracts or drawings. The second was the cost effectiveness. You could take advantage of economy long-distance phone rates and send the fax whenever it was cheapest.

Woods said that the hardware for a computer-based facsimile included a plug-in fax card, a scanner, a laser printer, and software. A complete system could send and receive text or images at preset times, and it could store documents to disk to be retrieved later. And while the electronically transmitted image lacked definition on screen, the laser printout was more than respectable. Shakespeare added that the PC could still be used as a PC since the fax software worked in the background.

256 Shades of Gray

Rolando Esteverena and Jerry Borrell joined Cheifet and Kildall in the studio. Esteverena was the president of Datacopy Corporation. Borrell was the editor of *MacWorld*. (There was also another Datacopy employee present to assist Esteverena with his demonstration.)

Kildall opened by asking Borrell about the importance of scanning to desktop publishing on both the PC and the Macintosh. Borrell said a lot of scanner vendors, such as

Datacopy, had started migrating from the PC to the Mac because of the rapid development of desktop publishing. In particular, the more recent 8-bit scanners were becoming more important in desktop publishing because of the need for halftone printing.

Killdall then asked Esteverena about his company's desktop scanner, the Datacopy 830. Esteverena explained that his company produced a range of products ranging from low-cost to higher-end, high-performance scanners. He agreed that the growth of desktop publishing on the Mac had been driving the demand for better scanners. The Datacopy 830 itself could be thought of like a copier, only instead of making a copy to paper, it made a copy into computer memory.

Esteverena then demonstrated the Datacopy 830 by scanning an image into a Macintosh II. He noted the scanner created the image, and then the included software–*MacImage*, also developed by Datacopy–analyzed the content of that image. This analysis focused on picture quality, particularly the level of detail. To illustrate, he showed a printout of a scanned image of a watch (see below). And thank to the Macintosh's ability to produce gray-scale, it was now possible to produce images for desktop publishing that nominally reflected photographs (albeit black-and-white photographs).

As Esteverena talked, his colleague finished scanning in an image of a woman's face into the Macintosh (see below). Esteverena explained how the software controlled the contrast, brightness, and other factors in the digitized image. He also demonstrated a function called "gamma correction," which changed the tones in the image.

Kildall asked about the memory requirements to store the image, noting the Datcopy 830 had a resolution of 300 dots per inch (dpi). Esteverena said an 8.5-by-11 image at 1-bit color depth (i.e., black and white only) took up about 1 MB of disk space. If you used gray-scale, however, that required additional space.

Kildall then asked if the *MacImage* software could resize images, which would be necessary for many desktop publishing applications. Esteverena said yes, the software could change the shape, content, and size of the image.

Cheifet asked Borrell if desktop publishing was the only application for this type of scanner. Borrell said no, some of the original scanners were developed for optical character recognition, but that research never came to fruition. So graphics scanning for desktop publishing was now the most popular application, but not the only one. (Esteverena later interjected that Dadtacopy did offer optional software to enable optical character recognition with its scanner.)

To wrap up the segment, Cheifet asked Borrell what factors a consumer should look for when buying a scanner. Borrell said there were several things. First, what was the dots per inch? Second, what were the number of bits it could capture? An 8-bit scanner was necessary to capture a full 256 gray-scale. Third, what were the supported file formats? If the software saved to a format like TIFF, you could use the scanned image with third-party applications like *ImageStudio*. Finally, how well did the manufacturer support the product after you took it home?

The Latest Advances in Digital Wrinkle-Removal Technology

Mark Zimmer and Mitch Stein joined Cheifet and Kildall for the next segment. Zimmer was president of Fractal Software, which developed the aforementioned *ImageStudio*. Stein was president of Spectrum Digital Systems, which developed another scanning software package, *TrueForm*.

Kildall asked Zimmer how his software was used in desktop publishing. Zimmer said the average person might use a scanned picture in a desktop publishing package like *Ready, Set, Go!* or *PageMaker*. To demonstrate, he pulled up *ImageStudio* on a Macintosh, which displayed a sample image of a woman’s face (see below). He showed how you could zoom in on the image to look at the finer details. For instance, this woman had a wrinkle in her eye. Zimmer said he would use the software to try and get rid of it. (Funny how they never use images of men in these demos.) He selected a sample texture from another part of the face and copied it over the wrinkle. Zimmer also showed how you could change the contrast and brightness in real time–i.e., the software automatically made the changes as you manipulated the controls–which was similar to the gamma correction function seen in the previous Datacopy *MacImage* demonstration.

Cheifet asked how fine could the changes be? He pointed to another wrinkle in the image of the woman's face. (Really, Stewart?) Zimmer then removed the second wrinkle using the same technique as before.

Kildall asked how the resolution of a scanned image compared to that of a 35mm photograph. Zimmer said *ImageStudio* could support any resolution. It depended on the scanner used. With a 300dpi scanner, you could input 8 bits per pixel, which would give you an 8 MB image on disk. But one of the benefits of *ImageStudio* was its ability to compress an image, so you would only need about one-third or one-fourth of that space.

Cheifet asked Zimmer to explain the importance of gray-scale and halftones in desktop publishing for people who were not artists. Zimmer said that when you output a picture to a PostScript device, it used halftones to show the picture because the device was only black-and-white. *ImageStudio* had full halftone output capability, as well as allowing for several different "screens" to create visual effects.

Turning to Stein, Cheifet asked about his program, *TrueForm*, which was used to scan forms. Stein noted that scanning in a form took up a large amount of data. He showed a sample one-page form, which scanned at 300dpi would take up 1 MB of memory. And then if you had to run the necessary operating system and software on top of that, you would need a Macintosh with at least 2 MB of memory. *TrueForm* controlled the scanning process and compressed the image "on the fly," so that the image only took up about 80 to 85 percent of the space.

Stein added that *TrueForm* addressed the Macintosh's display resolution limits, which was just 72dpi. So the software created a second version of the scanned image that could be displayed on the screen, while preserving the higher-resolution version for printing. Cheifet noted this answered his earlier question about what you could do with a scanner besides desktop publishing. Stein then showed a printout of the scanned form he created with *TrueForm*, which closely matched the original form.

Pixar's Pivot to Medical Imaging

Wendy Woods returned for her second remote segment, which opened with scanned images of a human skull. Woods said that this was a dream for many doctors: the ability to look inside the human body without surgery. And this technology–called *volume imaging*–was created by a company called Pixar. (Yes, that Pixar.)

Data from CAT scans and other sources were fed into Pixar's computer, Woods said, and used to generate a variety of views of the body. Johns Hopkins University in Baltimore, Maryland, was among the few hospitals to regularly use the Pixar in diagnosis. Doctors said the images alone had changed their decisions regarding operations or implants in about one-quarter of their cases. But many wondered why it took so long for this technology to produce these kinds of images.

Pixar co-founder Alvy Ray Smith told Woods that memory was the main reason. Specifically, computer memory wasn't large enough–i.e., it wasn't cheap enough in large quantities–and the processing power required to address that memory wasn't cheap enough. But now those things had changed. And Pixar was the first company to exploit cheaper processing power and memory.

Woods said that while the Pixar computer (see below) was not exactly inexpensive at $50,000, just two years ago that same machine was nearly triple the price. Now, the medical community was so enthusiastic about the technology, Pixar staff predicted that most radiologists would be using these computers within the next five years. By then, the technology was also expected to fit inside of a desktop machine and be radically less expensive.

Moving Beyond Paper and Film?

Jennifer Moller and Michael Marcus of PictureWare joined Cheifet and Kildall for the final studio segment. George Morrow was also present.

Kildall asked Marcus, PictureWare's president, how his company product, *PicturePower*, differed from those previously demonstrated. Marcus said his software enabled you to get real-world color picture–via video camera–into a computer database. You could then treat that picture as thought at it were just another field in that database, so you could combine it with text and later retrieve those images based on whatever attributes you defined.

Kildall asked about the hardware requirements for *PicturePower*. Moller, PictureWare's marketing director, showed the setup (see below). There was a video camera hooked up to a board inside of an IBM PC-compatible computer. This board captured the analog image and converted it into a digital file for storage. You could then display the image on a monitor.

Marcus then demonstrated some applications of the database software, including pictures of houses for a real estate broker, a jewelry store inventory, digitized images of signatures for identity verification by a bank, and security photos for an employee ID system, among other examples. Cheifet asked if *PicturePower* worked with other databases. Marcus said the software had its own internal database manager and data communications module. But it was also capable of operating with other database managers.

Moller continued the *PicturePower* demo, which showed the actual database manager. She said you could customize the database to display multiple pictures per entry. You could also annotate individual images. She then explained the database manager's query function, which allowed users to search for a specific entry. She also demonstrated how to add a new picture to the database.

To end the episode, Cheifet asked Morrow for his thoughts. Morrow said that most of the information in society was either on film or 8.5-by-11 sheets of paper. This type of scanning hardware and software allowed you to treat all of this information the same as you did a name and address. That would have enormous benefits. For example, many grocery store chains used barcode scanners to gather information about how well certain products sold. When you had more information to manipulate, there was much more there than met the eye. And now it would be possible to digitize information that was not readily available at the moment.

Pixar Co-Founder Forced Out by Raging Asshole

Pixar, Inc., is one of those companies that's been mentioned in passing a few times on *Computer Chronicles* but not directly featured until this episode. Back in January 1986, Stewart Cheifet reported during "Random Access" that the recently released film *Young Sherlock Holmes* featured a computer-generated special effect of a knight jumping out of a stained-glass window. Cheifet noted that it took six engineers working with the Pixar computer about nine months to create the 38-second shot.

What became Pixar started out as a computer graphics research group at the New York Institute of Technology (NYIT) led by Edwin Catmull and including Alvy Ray Smith, who earned his doctorate in computer science from Stanford. The group's goal from the start was to create a fully computer-animated film. But when NYIT ran into financial problems, *Star Wars* director George Lucas hired Catmull, Smith, and several of their colleagues to join his company, Lucasfilm, Ltd., to continue their work as the company's new computer division.

Lucas' subsequent divorce led him to spin-off the computer division into a separate company, with deposed Apple co-founder Steve Jobs purchasing a majority interest for $5 million. This was 1986, nearly a decade before Pixar would finally realize Catmull and Smith's goal of releasing an animated feature film. In the meantime, Jobs was eager–and probably desperate–to realize an immediate return on his investment. So Pixar pivoted towards developing computer graphics hardware targeting the medical industry. As Smith told Bart Eisenberg of the *San Francisco Examiner* in December 1987, "We came here to do Lucasfilm's bidding and start a graphics lab. But five years ago, I'd have never guessed that we'd be in the medical business."

The move received approval from market analysts, one of whom told Eisenberg:

> Pixar has made an important transition from research center to profit center. They have begun to operate as a business. Pixar has a 'gee-whiz' product–but they are running with the realization that you need more than that. A lot of companies never get to that point.

Of course, selling machines that cost between $50,000 and $100,000 wasn't exactly a high-volume business in 1987. Indeed, Smith told Eisenberg that Pixar had only sold about 110 machines total. In February 1988, Pixar released a less-expensive model–the $30,000 Pixar II (or P-II). But Jobs and the Pixar management quickly realized that hardware was not the path to profitability. In 1990, Pixar sold off its hardware division to Vicom Systems for $2 million. Pixar then redoubled its focus on animation software, which in turn led to the production of its first feature film, *Toy Story*.

Sadly, Smith left Pixar just after *Toy Story* got the go-ahead to start production in 1991. (The film was not completed until 1995.) A 2021 *Wired* profile of Smith by Steven Levy pointed to Jobs as the main reason for Smith's departure:

> Smith and Jobs routinely butted heads. Jobs often began meetings with an intentionally outrageous statement, and Smith made a point of pushing back. "It was a pure ego competition —Alvy wanted his vision to be dominant, and there was no way that was going to happen,"

> says Pam Kerwin, who was Pixar's general manager.
>
> Meanwhile, Pixar kept making short films that won acclaim. One, about lifelike desk lamps, even got nominated for an Oscar. Jobs saw them as marketing vehicles; Smith and Catmull saw them as test runs for The Movie.
>
> At first Jobs tolerated Smith's aggressions. Eventually, though, he began to lose patience. And then came the whiteboard incident. At a Pixar board meeting in 1990, Jobs was complaining that Pixar was behind on a project. Smith said that NeXT was behind on its products. As Smith recalls it, Jobs began mocking Smith's Southwestern accent. "I had never been treated that way. I just went crazy," Smith says. "I was screaming into his face, and he's screaming back at me. And right in the middle of that crazy, absolutely insane moment, I knew what to do. I brushed past him and wrote on the whiteboard."
>
> Those few feet to the whiteboard took Smith past the point of no return. No one wrote on Steve Jobs' hallowed whiteboard. As Smith took the marker and scrawled—he doesn't even remember what he wrote—he was committing Steve-icide. "I wanted out of there," he says. "I didn't want that guy's poison in my life any longer."

After Pixar, Smith co-founded Altamira Software Corporation, which developed image editing software for the IBM PC platform. Microsoft purchased Altamira in 1994, essentially to gain Smith's expertise. Smith stayed on with Microsoft until 1999, when he largely retired from the industry. In 2021, Smith released *A Biography of the Pixel*, which includes a semi-autobiographical look at his own role in helping to build the computer animation industry.

Datacopy Made More Money Selling Business Than Scanners

Ridiculously expensive hardware was really the theme of this episode. The Datacopy 830 desktop scanner was another case in point. While the scanner tested and reviewed well, it retailed for $2,800. And that didn't include the *MacImage* software or the SCSI interface to actually connect the device to a Macintosh. With those "extras," the total price of the scanning package demonstrated on *Chronicles* came to around $3,500.

Jim Heid, reviewing the Datacopy 830 for the January 1988 issue of *MacWorld*, said *MacImage* was "what really sets the 830 apart" from the other 300dpi scanners then on the market:

> The programs accompanying most scanners have bare-bones gray-scale features. Rarely can you edit gray-scale images or change their brightness and contrast (a process often called *gamma correction*). For gray-scale work, you need to spend a few hundred dollars for an image-processing program such as Letraset's *ImageStudio* or Silicon Beach's *Digital Darkroom*.

Heid added, however, that *MacImage* was prone to crashing in his tests. And overall, he felt the $3,500 price tag for the 830 package was too high. So his advice was to "shop around" unless there was a good deal available for the Datacopy machine.

Much like Pixar, Datacopy struggled to make money on its innovative but expensive hardware. In 1987, the company reported a $1.3 million loss on $13 million in sales. Fortunately, its scanner technology was desirable enough to attract a buyer for the company. In May 1988- just a few months after this episode aired–Xerox purchased Datacopy for approximately $31 million in cash.

Rolando Esteverena stayed on for time after Datacopy became a Xerox subsidiary. But he eventually departed the company and took over as CEO of Arizona-based ADFlex Solutions, a manufacturer of computer parts. ADFlex was a spin-off of another company, Connecticut-based Rogers Corporation, which sold what had been an unprofitable division to a group of managers and investors. Esteverena led the newly independent ADFlex to profitability for several years, but after the company posted a $2.6 million quarterly loss in early 1999, he resigned as chairman and CEO. Esteverena subsequently co-founded and served as CEO of a tech startup, Boats.com, a search engine for people looking to buy boats. That company was later sold and remains in business today.

Zimmer's Painter Journey

Mark Zimmer and Tom Hedges created *ImageStudio* under a partnership they called Fractal Software. Zimmer, who had been a programmer since the mid-1970s, recalled on his blog in 2011 that their first commercial product was *SoundCap*, an audio digitizing program. Zimmer then started working on a project he called "GrayPaint," which he intended to be a a "more realistic drawing" program. It was Hedges who proposed tying this program to scanners.

Zimmer and Hedges showed their combined prototype for what was one of the first image editing programs to Marla Milne, a manager at Letraset USA, the company that distributed the desktop publishing package *Ready, Set, Go!* Letraset agreed to publish Fractal's digital imaging software, which was named *ImageStudio*. Letraset subsequently commissioned Fractal Software to develop a color version, which was called *ColorStudio*.

In 1990, Letraset closed its software division, which meant *ImageStudio* and *ColorStudio* would no longer earn any royalties for Fractal Software. By this point, Zimmer was working on a new computer drawing program, which he called *Painter*. A few months later, Zimmer and Hedges turned their partnership into a company, Fractal Design Corporation, with Zimmer as president and CEO and Hedges as chairman. Fractal Design formally launched *Painter* at the August 1991 Macworld Expo in Boston. At the show, Zimmer recruited an experienced artist, John Derry, to join Fractal Design as a vice presiden. Derry would go on to co-develop future releases of *Painter* with Zimmer and Hedges.

Painter proved an enormous success from the outset. So of course, Fractal Design decided to go public. The company's November 1995 initial offering raised approximately $20.5 million. The company shortly thereafter announced plans to move into a new 40,000 square-foot headquarters located in a historic property in Santa Cruz, California. A few months later, in February 1996, Fractal made its first acquisition as a public company, buying Ray Dream Inc., a 3D graphics software company, in a stock swap valued at $47 million.

One year later, in February 1997, Fractal Design agreed to merge with another company, MetaTools Inc., in yet another stock swap. This was really a MetaTools acquisition as its shareholders retained a majority of the combined company's stock and board seats. Leslie Wright, Fractal's chief financial officer at the time, told the press that one reason for the deal was the uncertain future surrounding Apple, which was still the main platform for *Painter*. Fractal was struggling somewhat as a result, and MetaTools had a growing business developing drawing software that targeted the amateur market, as opposed to the industry professionals served by *Painter*.

After the deal closed on May 30, 1997, the combined company was renamed MetaCreations Corporation., with Jim Wilczak, the CEO of MetaTools, remaining in that role. Zimmer became MetaTools chief technical officer, with Hedges taking the role of chief systems architect. Wright, who was let go, was nevertheless bullish on the company's future, telling Jennifer Pittman of the *Santa Cruz Sentinel*, "I've seen mergers that have gone well, and I've seen mergers that have gone terribly. I think this one has a much higher chance of being one of the goods ones."

Well, Wright probably spoke too soon. The board quickly replaced Wilczak with an outside CEO, Gary Lauer, who decided that MetaCreations should pivot to being a "creative web company." (Remember, it was the dot-com bubble.) But creative didn't mean profitable. And in fact, MetaTools/MetaCreations wasn't profitable either before or after the Fractal Design merger.

In December 1999, MetaCreations announced it would report a fourth-quarter loss of around $40 million. At that point the company fired half of its staff–including Lauer–and Zimmer then stepped into the CEO's role.

But this was just a temporary move. The board instructed Zimmer to sell off the graphics division–i.e., the part of the company that made *Painter*–so that MetaCreations could double-down on its efforts to focus on "electronic-commerce visualization products," according to *Bloomberg News*. (MetaCreations renamed itself twice more before it was acquired in 2008.) Zimmer complied, and MetaCreations sold *Painter* and its related products to Canada-based Corel Corporation in early 2000. Zimmer then resigned as CEO and he, Hedges, and Derry formed a short-lived consulting company called Fractal.com to advise Corel on what was now *Corel Painter*.

In 2003, Zimmer joined Apple as a software development engineer, where he remains to the present day.

PictureWare a Brief Diversion in Marcus' Career

Michael Marcus had a long career in the software industry before coming to PictureWare. Born in 1938, Marcus grew up in New York City and earned a physics degree from Brooklyn Polytechnic University (now the New York University Tandon School of Engineering). Through a friend of his stepfather, Marcus got his first job with Sperry Gyroscope Company in 1959, where he had to teach himself assembly language so he could program a specialized computer used to calculate navigational data on submarines.

In 1962, Marcus joined Computer Usage Company, a software consulting firm, where he worked on projects like air traffic control systems. Eventually, Marcus decided to start his own consulting company, Realtime Programming Corporation. Marcus ended up merging Realtime Programming into a new entity called Realtime Systems, which had been formed by two of his existing consulting clients. Among Marcus' projects for Realtime was an order matching system for stock brokerages.

After Realtime Systems was sold in 1969, Marcus bought back the rights to his order-matching software and set up a new company, System Implementation Corporation. That company shut down around 1973. Marcus recalled in an 2013 interview with Burton Grad for the Computer History Museum that with a slowdown in the economy–which hit the brokerage business especially hard–he simply ran out of money. So he decided to wind down the business and became an independent consultant for the next 12 years.

PictureWare came about because of David Sherdel, whom Marcus had worked with on one of his consulting projects. According to Marcus, Sherdel had the idea for creating a system to capture and store photographic images in a computer database. Sherdel wanted Marcus to actually run the business, and he agreed.

Through a contact, Marcus met with Safeguard Scientifics Inc., a Philadelphia-based venture capital firm, which agreed to invest $2.2 million in PictureWare, which was also based in Pennsylvania. This funded the release of *Picture Power*. Marcus recalled to Grad, "[I]t was the very early days for that kind of technology, but we actually did start to sell units here in the United States. And we sold units in the Netherlands."

And to continue our theme, the complete *PicturePower* system demonstrated in this episode cost $6,230. This included the camera, the add-on board (which was made by AT&T), and all of the necessary cables. The software was also available separately from AT&T for $945.

For some reason, Safeguard Scientifics didn't see much long-term potential in this product. With the money running out–and Safeguard unwilling to invest more–Marcus decided to leave and joined another company, AGS Management Systems, as its CEO in 1989. Shortly thereafter, in October 1990, Safeguard sold its majority interest in PictureWare to Oklahoma City-based Norick Software Inc. According to a contemporary report by Jim Denton of the *Daily Oklahoman*, PictureWare had gross sales of just $800,000 in 1989. And Norick, which developed rating software for the insurance industry, apparently didn't pay Safeguard any money upfront for PictureWare. Instead, Norick promised to continue paying royalties to Safeguard on future sales of *PicturePower*. But it doesn't appear that Norick kept the product line going for long after the acquisition.

As for Marcus, he remained with AGS Management Systems until it was sold by its parent company in 1993. Marcus then joined the IT services company Unisys, which coincidentally was formed when Marcus' first employer, Sperry Corporation, merged with Burroughs Corporation in 1986. Marcus later relocated to California and joined SPL WorldGroup, which was acquired by Oracle Corporation in 2006. Marcus officially retired after the sale but continued to consult for Oracle for several more years.

Notes from the Random Access File

- This episode is available at the Internet Archive and first aired during the week of January 6, 1988. The recording uploaded to the Archive was a rerun that aired during the week of December 16, 1988.
- Paul Schindler's software review for this episode was *Gofer*, a $60 program from Microlytics that enabled users to index and search their text files.
- Mitch Stein and John Carnes founded Spectrum Digital Systems in 1984. The company was based in Madison, Wisconsin, and developed its *TrueForm* software thanks partly to grants from the University of Wisconsin and investment from the City of Madison. Several months after this episode aired, In October 1988, Adobe Systems purchased the privately held Spectrum Digital Services for undisclosed terms. Adobe subsequently released *Adobe TrueForm 2.0* in 1989.
- Mitch Stein stayed on with Adobe after the sale of Spectrum Digital Systems. In 1990, he co-founded a short-lived startup, Slate Corporation, which focused on pen-based computing technology. He later had stints at Apple, IBM, Oracle, and Yahoo, among other companies. In 2015,

he co-founded DocAmp, a healthcare technology company. Since 2006, he's also had his own user experience consulting firm, Stein Design.

- Textainer, the parent company behind Inter-Ocean Leasing, is still in business today. Founded by Ken George and Jim Sullivan in 1979, Textainer reported over $2 billion in active shipping container leases as of 2021.

Chapter 12: MacWorld Expo/ San Francisco 1988

The January 1988 Macworld Expo in San Francisco was the second industry trade show to merit its own *Computer Chronicles* episode after the Las Vegas COMDEX show. *Chronicles* had devoted segments to earlier editions of Macworld–including the inaugural event in 1985–but this was the first time that the semi-annual gathering received full-episode coverage. No doubt this reflected the growing interest in the Macintosh platform, bolstered by the release of the Macintosh II and Macintosh SE the previous year as well as everyone's favorite new software middleware product, HyperCard.

In a brief studio introduction recorded after the event, Stewart Cheifet and co-host George Morrow looked at the Macworld Expo program. Chiefet noted the number new vendors, peripherals, and software applications at the event. He also showed a copy of Jan Lewis' *HyperAge* magazine featuring Apple CEO John Sculley on the cover. All of a sudden, Cheifet noted, the Macintosh was hot. How did that happen?

Morrow said that timing had a lot to do with it. He recalled at first he thought it was crazy to put a soft drink salesman–Sculley previously headed marketing for PepsiCo–in charge of a computer company. But it turned out to be one of the best things that happened to Apple. In the beginning when the market was "playful," Apple benefited from Steve Jobs and Steve Wozniak. Then once the computer market ran out of hobbyists, along came *VisiCalc*, which pushed business sales of the Apple II. As the market matured Apple needed a marketing guy like Sculley. When the Mac came out it could have failed, Morrow noted, but then the laser printer came along. And today, Apple was catching a new wave of users who were work-at-home professionals.

Color on Your Mac SE…for a Steep Price

Stewart Cheifet narrated the first of two remote segments recorded at the Macworld Expo, which was held from January 15 to 17, 1988, at the Moscone Convention Center in San Francisco. Cheifet said that when the doors opened to this year's expo, it was just a few days from the Mac's fourth anniversary. But for anyone familiar with the Mac's early days, four years might as well have been four decades. The Macintosh II's expansion slots and color display made it the star of this year's show, attracting a wealth of new hardware and software.

Desktop publishing, Apple's modern contributing to printing, was once again prominent at Macworld, Cheifet noted, starting with software to take advantage of color. Adobe Systems demonstrated its color version of *Illustrator* called *Adobe Illustrator 88*, which let the user preview and specify color separations on a wide variety of output devices. William H. Paxton, Adobe's director of advanced development, told Cheifet that to make the program easier to use, they added a "freehand" tool that let the user trace over outlines, with the software then automatically curving the lines to make them fit. *Illustrator 88* could also interpolate different shapes given two starting shapes. For example, you could start with images of the letter "S" and a swan, and the software could generate the intermediate images to "morph" one into the other.

Chiefet said that Adobe also addressed the problem of discrepancies between different screen displays and final output by introducing Display PostScript. Paxton explained that this took the basic PostScript interpreter used in laser printers and adapted it for use on computer displays. The goal was to provide a high-level, device-independent graphics model for software developers to use. This gave developers more powerful built-in graphics for their applications and end users more flexibility when it came to selecting hardware. With respect to the latter, Paxton said Design PostScript solved the problem of worrying whether a particular piece of software would be compatible with a given graphics adapter.

Meanwhile, at the Aldus Corporation booth, Cheifet said that *PageMaker 3.0* with color support was on display. Aldus also had a new program called *Aldus FreeHand*, which combined drawing tools with color, special effects, and *PageMaker*-like handling of text. And for those desktop publishers having difficulty making professional-looking documents, San Francisco-based Hypersoft announced a HyperCard-based application called *The DTP Advisor*, which offered graphic arts advice on subjects such as layout, typography, and the printing process.

Continuing the color theme, Orchid Technology announced a $695 graphics adapter card for the Macintosh SE called the ColorVue SE, which could display up to 16 colors from a palette of over 4,000 via either an Apple RGB or IBM VGA monitor. And if that wasn't good enough, several manufacturers such as Supermac and Jasmine Technologies introduced 24-bit color adapter boards. For example, Jasmine's Rembrandt board could display up to 256 colors on-screen from a palette of over 16 million. Joseph C. Edozien, the director of advanced product development for Jasmine, told Cheifet that the significance of 24-bit versus 8-bit color was that it allowed for a much more accurate rendering of reality.

Cheifet noted the Rembrandt boards retailed for between $2,000 and $3,000 and cautioned that most Mac users would have to invest in additional hardware–at least 4MB of RAM and an 80MB hard disk–to store the memory-intensive color images. After all, 24 bits-per-pixel of color required 24 times as much memory as a monochrome screen. Still, Cheifet quipped that compared to other color computers, the Rembrandt system might be a bargain. Edozien said that up to now, you could only produce this degree of color image using a "super-mini" computer or workstation in the $30,000 range.

To match these color adapter boards, Cheifet said there was also a number of vendors offering new high-resolution monitors, such as 19- and 20-inch displays from Oregon-based E-Machines. (As I noted in an earlier blog post, this was not the South Korean eMachines company that became famous for selling cheap PCs in the 1990s.) These screens measured over 1,000 pixels across by

800 pixels vertically–or about 2.5 times as much as a standard Macintosh II display. This allowed the E-Machines monitors to display documents at their full height and size.

Video adapters were also prominent at Macworld, Cheifet said, both for capturing and manipulating digitized images:

- MegaGraphics demonstrated its MegaShot frame grabber, which was aimed at desktop publishing and presentation users. MegaShot could capture images from a video camera or VCR at 256 levels of gray. The system would retail for around $1,000.
- Silicon Beach Software introduced an image processing program called *Digital Darkroom*, which included automatic tracing of digital bitmap images and special effects for gray-scale graphics. The program also featured image enhancement for cutting, pasting, and blending dissimilar images.
- Computer Friends of Portland, Oregon, introduced *TV Producer*, a graphics overlay board for the Macintosh II that could lock into an incoming video signal and add special effects.

On the monochrome monitor front, Sigma Designs showed off its Laserview displays, which could display resolutions of up to 1600x1200 pixels. Cheifet noted these monitors were primarily targeted at desktop publishing and engineering applications as they effectively eliminated the need for scrolling.

As for Apple itself, their product introductions focused on three new models of the LaserWriter laser printer. The two higher-end models, the LaserWriter NT and LaserWriter NTX, featured PostScript drivers, while the lower-end LaserWriter SC used the QuickDraw system built-in to the Macintosh operating system. (In other words, the SC was cheaper because Apple didn't have to pay Adobe for the PostScript license.) Cheifet noted that the prices ranged from $2,799 for the SC to $6,599 for the NTX.

Apple also introduced a new hardware MIDI interface for the Macintosh and the Apple IIgs. The connector, which Cheifet said was about the size of a pack of cigarettes, retailed for $99.

And now that Apple had finally accepted the concept of an "open" Macintosh, Cheifet said, products that were once common to PC shows were now turning up at Macworld Expo. For example, Macpeak Systems of Texas demonstrated the first 68030 accelerator board for the Macintosh II, which was expected to sell for $2,000. Rich Lucas, a product manager for Macpeak, said the accelerator board would be used somewhere like a scientific lab where a Macintosh would need to monitor and record data from a number of instruments simultaneously. An accelerator board could theoretically allow you to input that data 3 to 4 times faster. And while Macpeak did not design its product for office use, Lucas said they were finding it had broader appeal then they had anticipated.

Cheifet noted that as with any computer trade show, many companies announced products at Macworld Expo but few of them were available for immediate delivery. A case in point was WordPerfect Corporation, which has been promising a Macintosh version of its popular MS-DOS word processor for over a year. So at Macworld, WordPerect sold $99 "beta" copies of *WordPerfect for Macintosh*. When the final version shipped, beta buyers could upgrade to the full-$400 package at no additional charge.

Finally, Cheifet said that Sunroom Marketing was trying to sell off several used–and now obsolete–Apple Lisa machines at $695 each. (The Lisa retailed for around $10,000 at launch in 1983.)

HyperCard HyperPromoted at HyperExpo

Wendy Woods took over narration duties for the second remote segment from the Moscone Center. She said that if the strength of a machine was based on the value and variety of its software, the Macintosh had proven itself a worthy competitor. Among the new generation of software on display was in the area of forms generation:

- California-based SoftView showed its graphically based application *FormSystem*, which let the user design their own forms and kept their consistency even after changes were made.

- Claris, the former software arm of Apple that had been spun off into its own company, showed off *SmartForm*, another object-oriented program to create forms. Yogen Dalal, Claris' vice president of product development, told Woods that business forms were currently a $6.5 billion market, and he expected software like *SmartForm* would help move that market onto the computer.
- Spectrum Digital Systems of Madison, Wisconsin, took a different approach with their product *TrueForm*, which let the user scan an existing paper form and digitize it onto the Macintosh. Mitch Stein, Spectrum Digital's president told Woods, "Why reinvent the wheel?" Or in this case, why not make use of existing forms? (Stein and *TrueForm* were both featured in the previous *Computer Chronicles* episode I covered on PC imaging technology.)

But Woods said the real software star of this year's Macworld Expo was Apple's HyperCard, with a number of companies announcing software "stacks" that worked with the middleware product:

- Activision showed off *Reports!*, which generated business reports from HyperCard stacks, and *City to City*, an electronic guide to the best food, lodgings, and other necessities when traveling throughout the United States.
- MacroMind demonstrated a HyperCard driver for its *VideoWorks II* program that made it possible to create real-time animated stacks–even in color on a Macintosh II.
- Cognition Technology of Cambridge, Massachusetts, showed off *MacSMARTS*, which it billed as the "first expert system" for HyperCard; in the demo, the stack helped the user determine the best way to ship a package.
- Throughout the Moscone Center, Macintosh SE machines provided a HyperCard-based guide to help visitors locate any vendor on the convention floor.
- Jan Lewis was at Macworld to promote her new *HyperAge* magazine, one of many HyperCard-based publications now being sold.

Aside from HyperCard mania, Woods said that a number products enabling the Macintosh to communicate with–and run–IBM PC applications were also on display at Macworld Expo:

- Apple Computer was finally shipping its AppleShare PC system.
- Tangent Technologies demonstrated a hardware-software package that could network the Macintosh not just to IBM PCs but also the new IBM PS/2 machines. Guy Mariande of Tangent told Woods that “quite a few” businesses were interested in this product.
- AST Research offered its Mac86 expansion board, which enabled IBM PC applications to run directly on a Macintosh.
- Insignia Solutions demonstrated *SoftPC*, a completely software-based method for running IBM PC applications on the Macintosh. Ian Vickerage, Insignia’s vice president of marketing, told Woods that they had tested over 70 PC applications to ensure compatibility with *SoftPC*.

Finally, Massachusetts-based Microtouch demonstrated a touchscreen monitor for the Macintosh SE, and Lightgate of Emeryville, California, showed off an optical mouse.

A Work-at-Home Mac Revolution?

Back in the San Mateo studio, Stewart Cheifet and George Morrow joined Jan Lewis and *Macworld* magazine editor Jerry Borrell for a postmortem. Cheifet opened by asking Morrow for his thoughts on the event. Morrow said it was quite an experience. It seemed like a much bigger show than either of the last two West Coast Computer Faires. And it was clear the Mac market was now wide open for smaller companies. He noted that one small vendor had about 50 people standing in line at their booth. He also believed that the Macintosh was now attracting a new kind of user–the work-at-home professional.

Lewis agreed. She said the Macintosh was still “for the little guys,” i.e. the small office or creative professional. But the work-at-home professional was now becoming a bigger group. Morrow pointed out that over the past three years, U.S. corporations had eliminated roughly 3 million jobs. A lot of those laid-off workers were still providing services for those corporations as independent professionals. And those independent professionals were using Macs. Borrell noted that Apple's own vice president of marketing told him the company was increasingly focusing their efforts on the home office. Indeed, about 85 percent of *Macworld* readers used their Mac at home.

Lewis noted there were some PC clone vendors targeting the home professionals such as Hyundai and Tandy. But Morrow said that Apple was in a much better position to "mine" this market because of their user interface. Lewis concurred, noting that even the design of something like the Macintosh file manager was a lot easier for users to grasp than navigating the "arcane" MS-DOS directory structure.

Turning back to the expo, Cheifet asked Borrell about the highlights and trends that he saw on the convention floor. Borrell said the major areas of growth were in communications, peripheral devices, and vertical software. Morrow asked what peripherals in particular. Borrell pointed to the new laser printers announced by both Apple and General Computer Corporation. He also cited the new graphics cards and video monitors. Morrow noted the show was very crowded. Lewis said that 20,000 people attended the first day, which set a record for a San Francisco trade show.

Cheifet asked Lewis about her highlights from Macworld Expo. Lewis said that HyperCard fever was absolutely evident. She pointed to Activision releasing two new HyperCard products. But there were a large number of vendors who were now following Activision's lead and jumping into the market. Morrow then prodded Lewis to mention her own HyperCard-focused magazine, which she brlefly discussed. Morrow asked Lewis if she was worried that HyperCard might not be a fad. Lewis said no, she thought HyperCard was going to revolutionize the way computing was done.

Apple-DEC Alliance Bolstered Mac's Big

Business Credentials

Perhaps the biggest story to come out of the January 1988 MacWorld Expo was one not even discussed on *Computer Chronicles*. That was the announcement of a “strategic alliance” between Apple Computer and Digital Equipment Corporation (DEC), then the number-two computer company in the world behind IBM. There had been rumors of such an alliance for months, and John Sculley confirmed it on the opening day of the expo.

The actual deal was limited in scope, according to a contemporary report from G. Pascal Zachary of Knight-Ridder, who said the agreement provided for “the joint development of products that link Apple’s Macintosh computers with Digital’s powerful VAX line” of minicomputers. Essentially, the two companies would develop a communications protocol enabling the Macintosh to function as an “intelligent terminal” for the VAX. From DEC’s perspective, this offered an elegant way of helping their customers replace older dumb terminals without having to get back into the personal computer business itself. (DEC previously failed to launch its own line of microcomputers called the Rainbow.)

As for Apple, it hoped the connection to DEC would give it more credibility with the large business market. As Peter Lewis of the *New York Times* observed, “[Apple] can now walk through the door of any Fortune 500 company with Digital, instead of sneaking in through the door to the art department, as it sometimes had to do in the past.”

At the same time, Sculley downplayed any suggestion that this alliance was a precursor to a sale of Apple to DEC. And DEC’s CEO, Ken Olsen, made it clear that Apple was just one of many alliances he planned to make in order to strengthen his company’s position. Still, John Markoff of the *San Francisco Examiner* cited the new alliance was proof of a “culture clash” between Sculley’s marketing team and the “fanatic Macintosh community,” who worried the Macintosh had strayed too far from its “populist origins.”

On the one hand, calling the Macintosh a “populist” computer was a bit rich given you could buy three of Jack Tramiel’s Atari ST machines for the price of one Macintosh at each computers’ respective launch prices. But Markoff had a point when it came to the software. The Macintosh’s first-to-market graphical user interface did make the personal computer far more accessible to people without prior experience navigating a CP/M or MS-DOS machine. And the recent introduction of HyperCard as an out-of-the-box middleware solution for non-traditional developers to create applications was, at least in theory, a game changer.

But when it came to hardware, Apple drew a hard line when it came to making its products more affordable for the average person. Markoff cited comments from Jean-Louis Gassee, Apple’s head of research and development, who said point-blank the company would never allow any licensed lower-price Macintosh clones. And Sculley’s priority was squarely on attracting new “power” users who were willing to spend at least $5,000 for the latest and fastest machine.

Notes from the Random Access File

- This episode is available at the Internet Archive and was first broadcast during the week of January 28, 1988.
- Paul Schindler’s software review for this episode was *Stepping Out* (Berkeley Systems Design, $95), a virtual monitor program for the Macintosh.
- Jerry Borrell spent over a decade editing computer magazines, including his stint as editor-in-chief of *Macworld* from 1985 to 1991. In 1992, he started Sumeria Inc., a publisher of educational CD-ROM software, as a subsidiary of IDG, the company that also owned *MacWorld*. Burrell eventually bought out Sumeria and took it independent. He continued to run the company until 2000 when he took over as editor-in-chief of the short-lived technology magazine *Upside,* which closed in 2002. Today, Borrell edits the blog *T&I*.
- Jan Lewis’ *HyperAge* was not the only HyperCard-themed magazine launched at this Macworld Expo. There were at least two other publications present: *HyperJournal* from

Iowa-based HyperMedia Technologies; and *HyperNews* from Training Resources Unlimited of Federal Way, Washington. *HyperJournal* was available as both a print magazine and a HyperCard stack, while *HyperNews* was exclusively published on disk.

- The plethora of color graphics displays for the Macintosh SE, such as Orchid Technology's ColorVue SE, came after Apple decided against including on-board color in its next planned revision of the machine. *Macweek* reported that Apple was concerned over "the bad track record of incompatible programs not currently able to run on the Mac II."
- In his MacWorld Expo keynote address, John Sculley presented a five-minute video describing a hypothetical product dubbed the "knowledge navigator," a future Mac that combined a computer, telephone, and television. Sounds ridiculous to me.

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